

JOURNAL OF CLINICAL  
AND EXPERIMENTAL  
PSYCHOPATHOLOGY  
&  
QUARTERLY REVIEW OF  
PSYCHIATRY AND NEUROLOGY

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VOLUME XIX, NUMBER 4, OCTOBER-DECEMBER, 1958

JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY

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QUARTERLY REVIEW OF PSYCHIATRY AND NEUROLOGY

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*Published Quarterly by*

MD PUBLICATIONS, Inc.

Félix Martí-Ibáñez, M.D., President

*Editorial and Advertising Offices*

30 East 60th Street  
New York 22, N. Y.

*Circulation Offices*

1507 M St., N.W.  
Washington, D. C.

30 East 60th Street  
New York 22, N. Y.

The Journal of Clinical and Experimental Psychopathology and Quarterly Review of Psychiatry and Neurology is published in March, June, September, December. The subscription rates are \$11.00 per year; \$28.00 for three years. Second Class Postage Paid at Philadelphia, Pa., and at Additional Mailing Offices. Published by MD Publications, Inc., 1507 M Street, N.W., Washington, D. C. ©Copyright 1957 by MD Publications, Inc. All rights reserved. Printed in U. S. A.

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**Clinical Psychopathologic Conferences** are often included as a feature of the JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY. This section will attempt to further the elucidation of correlations and associations between clinical, neurologic, psychological, and biologic elements. Clinical case presentations illustrative of psychophysiopathologic disorders will be gathered from psychiatric hospitals, clinics, and psychiatrists throughout the world. Manuscripts together with accompanying illustrations should be forwarded to the JOURNAL OF CLINICAL AND EXPERIMENTAL PSYCHOPATHOLOGY, 30 East 60th Street, New York, N. Y., Attention: Editor, Clinical Psychopathologic Conferences.

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Experimental Catatonia and  
Psychopharmacology of Neuroleptics

*H. Baruk, J. Launay, and J. Berges*

PARIS, FRANCE

After its description by Kahlbaum,<sup>1</sup> catatonia was interpreted in two opposite ways. Some considered it to be a disorder related to a lesion localized in the central nervous system, and especially an involvement of the extrapyramidal system; others classified it as a purely psychological and psychogenic disorder, not related to the central nervous system. These two one-sided views, one exclusively considering the motor factor and the other the psychic factor, could but lead to a dead end.

Data from clinical and experimental physiology caused the problem to be reconsidered. Although the initial studies of Fröhlich and Meyer<sup>2</sup> seemed to confirm the first hypothesis because they did not show the presence of action currents in the muscles of the cataleptic patient,\* these authors believed that catatonia constituted a tonic muscular phenomenon. Research by Claude et al.,<sup>3</sup> however, showed evidence of action currents in the muscles of catatonic patients whether at rest or during the cataleptic episode. These currents were similar to those seen in voluntary muscle contraction but disappeared suddenly when a psychogenic diversion occurred. This new evidence, confirmed by all investigators of the

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\* In a report presented at the Medical Congress in Antwerp (1958) on the studies by Fröhlich and Meyer, Divry writes: "Their research being done through the skin may raise some objections."

problem, and similar findings in relation to posture reflexes, showed that catatonia is a psychomotor phenomenon in which both psychogenic and motor factors are inseparable. Clinical and physiologic studies by Claude and Baruk showed the psychomotor aspects of catalepsy: a patient may let a lifted limb fall back to take its former position again "just as a soldier would obey orders"; the bizarre characteristic posture and the impressive attitude in flexion may cease immediately when his attention is awakened; the voluntary negativistic contraction may occur afterward. The studies showed psychic reactions to activities that take place close to the patient; a kind of phenomenon of induction and psychomotor automatism (Baruk and Nouel) combined or attenuated with negativism or opposition; the strong emotional state (patheticismus) with writhing, such as is seen in major hysteria, which disappears when the patient can be awakened. The expressionless eyes and occasionally a rigid expression of fear, occurring with all these phenomena, can be detected on film records or by physiologic signs. They reveal the characteristic psychic stupor of catatonia inhibiting either the psychic activity or automatism control as evidenced by initiative ergographic curves (Claude, Baruk, and Porak; Baruk, Gomez, and Rossano, and so on) as well as stereotypies, verbigeration, impulsions, and so on. These phenomena vary according to attention or affectivity conditions.

However, these obvious psychic disturbances are accompanied by neurovegetative changes that can only be ascribed to the psyche. They are incontestably of a biological nature: vestibular unexcitability (Baruk and Aubry), electrocardiographic changes (Baruk and Racine), and especially orthostatic acrocyanosis simulating arteritis obliterans. They disappear completely when normal psychic activity is re-established.

Besides clinical physiologic data, experimental physiologic data showed that catatonia could be induced in animals. Peters and de Jong,\* using bulbocapnine in their experiments, failed to establish a relationship with clinical catatonia, so that in 1928 Divry reported: "In 1922, Dr. de Jong wrote that bulbocapnine catalepsy could not be of any significance in relation to the studies of catatonic manifestations clinically observed." De Jong, who in his initial work believed that catalepsy consisted of absolute conservation of attitudes, according to the early electromyographic findings of Fröhlich and Meyer, renounced his attempts to establish such clinical correlation and directed his research to the activity of bulbocapnine in the treatment of tremor. Then de Jong's attention was drawn to the research of Claude et al.,<sup>3</sup> who detected currents of action in the muscles of catatonic patients similar to those he himself had discovered in animals immobilized with bulbocapnine. In 1928, de Jong with Baruk,<sup>5</sup> in their clinical work combined with experiments with animals, identified not only a superimposed psychomotor catalepsy but also negativism, hyperkinesis, neurovegetative disturbances, and so on. Experimental catatonia was born.

Moreover, de Jong and Baruk established the "law of stages"<sup>6</sup> in correlation with the dosage: bulbocapnine in small doses induced sleep; in moderate doses, catatonia; in large

---

\* De Jong became interested in catatonia following his general plethysmographic research during which he discovered the characteristic vascular rigidity in catatonic patients, already pointed out by Bumke and Kehrer<sup>15</sup> and Koppers.<sup>16</sup>

doses, epilepsy. These facts, and especially the relationship between catatonia and sleep, helped to explain the cases of catatonia in man following the rhythm of sleep (Baruk and Albane), as well as the typical oneiric delusions of toxic origin in the catatonic patient described by Baruk.<sup>7</sup> Thus, animal experiments showed not only the external habitus but also the complete psychopathology of the catatonic patient. Definite pathologic psychopathology,<sup>8</sup> including clinical symptomatology and detailed biophysiological data, could be established as well.

Therefore, in addition to the two classical systemic conditions, one related to localized lesions in the brain with direct correspondence of symptoms with anatomic or functional involvement, and the other related to purely psychogenic disorders, there was a third variety of mental and physical disorder in which a toxic action determined personality disturbances.\* This establishment of a morbid personality through toxic action explains the unbinding of voluntary processes and shows the considerable importance of delusions in catatonia. (It is because of the presence of delusions that for a long time catatonia was classified as part of paranoia.) Delusions frequently explain the patient's bizarre behavior; they are due to a toxic factor.<sup>7</sup>

A new chapter in psychophysiology had begun, that of the "poisons of the will"<sup>18, 19</sup> and their relationship to personality disorders.<sup>8</sup>

Experimental studies with animals clarified somewhat the mechanics of involvement of voluntary psychomotor processes. Though de Jong and Schaltenbrand, Krause and de Jong, and Baruk and Puech failed to establish a definite relationship between catatonia and a localized cerebral lesion, and though there were still controversial opinions about the role of the cerebral cortex or of the centers in the base of the cerebrum (Schaltenbrand, Cobb), the research on monkeys by Baruk and Puech<sup>9</sup> demonstrated the role of the diffusion of toxic involvement† in the production of catatonia and psychomotor disorders.

Such diffusion plays a role through a toxic effect not only on the cells but also on the cerebral vessels.<sup>10</sup> Baruk et al<sup>11</sup> demonstrated cerebral vasoconstriction during experimental bulbocapnic catatonia; the problem of cerebral circulation and of cerebral edema was to be discussed as a whole in the course of determination of experimental catatonia with ACTH.<sup>13</sup> During catatonia, this vascular action also affects the systemic circulation, the heart,<sup>14</sup> vessels of the limbs, oscillometric index, and so on. De Jong in his studies on plethysmography observed in catatonic patients a "special vascular rigidity" already noted by Bumke and Kehrer<sup>15</sup> and Koppers.<sup>16</sup>

On the other hand, research by Baruk and de Jong in animal series and in phylogenetic

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\* In catatonia, division or juxtaposition of the motor and psychic factors would be purposeless. The dualistic aspect which made the problem unintelligible for so long calls for a reversion to unicism, catatonia being presumably considered as a personality disorder of a toxic origin.

† See the recent studies by Passorant, who describes the action of bulbocapnine on the cortex and that of LSD-25 on the mesencephalon. We recently produced experimental catatonia with LSD-25 in birds. It is likely that the toxic action exerts itself not only on the brain but also on the periphery. This was emphasized by Poppi with regard to bulbocapnine and suggested by the researches of Apello and by the signs of flexibility cerea in human catatonia.

development, which was carried on in the Amsterdam Zoo, revealed that experimental catatonia could be elicited only in vertebrates of the higher order with a sufficient development of the central nervous system. In the lower order of vertebrates (fishes, reptiles, amphibians) experimental catatonia could not be elicited, the motility in such animals varying between akinesia and impulsion but without truly flexible or adjusted psychomotor initiative.

Following their work in collaboration, Baruk and de Jong carried on their research separately, one in Paris and the other in the Netherlands and later in the United States. This was the etiologic phase of experimental catatonia. *Cannabis indica* (1930), mescaline and acetylcholine (1931), and epinephrine (1932) were used successively by de Jong to induce experimental catatonia. In 1932, Baruk, Bidermann, and Bertrand obtained experimental catatonia by means of an allergic tuberculous meningoencephalitis; and in 1933, with a neurotropic toxin of *Bacillus coli*, they obtained emotional expressions characteristic of this type of experimental catatonia and oneiric phenomena closely simulating those in man. These findings were noted again 10 years later (1943) by de Jong in bulboapnine catatonia. In 1934, Baruk and Camus produced a biliary experimental catatonia. They pointed out the role of the hepatointestinal factors in the development of catatonia and applied the new therapy (serotherapy, duodenal aspiration). Previously, in 1932, Claude et al<sup>37</sup> had described signs of hepatic deficiency in catatonia; this was again observed by de Jong in 1945.<sup>38</sup>

Some years after Baruk produced experimental catatonia with *Bacillus coli*, de Jong et al (1945) experimentally induced catatonia through artificial obstruction of the intestinal lumen; in 1936, through ligation of the hepatic artery; and, in 1938, by means of an Eck fistula.

Finally, de Jong agreed with Baruk's conception of the considerable importance of the hepatointestinal toxic factors, which had been shown by the Italian school and Buscaino. De Jong, in a paper written shortly before his recent death, emphasized the convergence of his own and Baruk's research carried out without any liaison in separate countries and with different methods.<sup>19</sup>

The purpose of the studies of Baruk and Camus from 1934 on has been and remains the identification of the material present in some pathologic biles that can be extracted by duodenal aspiration and that produces catatonia. Although routine examination of bile showed that the substance was not a component of normal bile (bile salts, pigments, cholesterol, and so on), it was present in the bile of some schizophrenic patients, in certain cases of jaundice, severe migraine, or rheumatoid arthritis, or occasionally in the bile of women during menstruation. This catatonigenic substance in bile is thermolabile, does not precipitate with heavy metals, and persists in the filtrated bile. Is it a chemical or a toxin? The research carried out by Mall and Georgi advanced our knowledge in this field. It was discovered that experimental catatonia could also be induced by means of asphyxia, poisonous gas (de Jong), the pituitary (Baruk), cerebral edema (Baruk), and so on.

#### EXPERIMENTAL CATATONIA AND NEUROLEPTICS

In their initial studies, de Jong and Baruk experimented with sedatives, mainly morphine,

and noted that experimental catatonia could not be produced with these drugs. Negative results also followed de Jong's experiments with phenobarbital sodium and Somnifene.<sup>30</sup>

Baruk and Massaut experimented on animals with chloralose and scopochloralose.<sup>39</sup> These sedatives and inhibitors of cortical activity failed to produce experimental catatonia;<sup>39</sup> however, chloralose is a very reliable drug in hysterical psychomotor disturbances. In animals, scopochloralose has no antagonistic action on experimental catatonia. There is some inhibition due to the adjunction of a paretic element which may originate from the cerebral cortex.

We became very much interested in the new drugs that were being introduced in psychiatric therapy, mainly chlorpromazine, various *Rauwolfia* extracts, and N. 68. We began an early detailed evaluation of each of them, studying them successively from the point of view of their psychopharmacologic effects in animal experimentation, i.e., law of stages, dosage, and activity in the phylogenetic series.

*Chlorpromazine.* Chlorpromazine was discovered in France by Charpentier and was evaluated from the physiologic standpoint by Courvoisier, Fournet, Ducrot, Kolsky, and Koetschet in the Vitry-sur-Seine laboratory. The specific psychiatric experiments on animals were carried on in our own laboratory.

**ANIMAL PSYCHOPHARMACOLOGY: EXPERIMENTAL CATATONIA.** The administration of a certain amount of chlorpromazine induces true experimental catatonia characterized by typical catalepsy and typical negativism, although hyperkinesia or emotional attacks (patheticismus) have not been noted, and, in contrast to other varieties of experimental catatonia, it was not associated with neurovegetative disorders, except for some instances of respiratory abnormalities. Disturbances in equilibrium and paresis were also noted.

In cats, definite disturbances of equilibrium were observed; ebrious gait with oscillations and deviations similar to those in cerebellar disorders appeared, as well as abnormalities in the Magnus postural reflexes. High dosage of chlorpromazine inhibited the rotation reflex of the head (*reflexe de retournement*). This fact is important since it is not seen in other types of experimental catatonia, even when high catatonigenic doses are given.

In contrast, epilepsy was never observed in the course of our experiments regardless of the dosage used.

We found toxicity low, and animals did not suffer from administration if chlorpromazine was given alone. In contrast, combination with 10-(2-diethylamino-1-propyl)phenothiazine resulted in potentiation with greatly increased effects, causing severe paralysis, respiratory disturbances, and disorders of the autonomic nervous system that were not observed when chlorpromazine was used alone. Finally, the chlorpromazine-induced experimental catatonia is of short duration, lasting only for a few hours.

**LAW OF STAGES ACCORDING TO DOSAGE.** It was shown that, in other varieties of experimental catatonia, the effects varied according to dosage. For instance, with bulbocapnine three stages are noted with increasing doses: sleep, catatonia, and epilepsy. With chlorpromazine there are also three stages: sleep, catatonia, and paralysis. On the other hand, it is of interest to compare dosage inducing experimental catatonia in animals with clinical dosage in man. For instance, in cats, even a dose of 25 mg. (equivalent to a parenteral dose

of 500 mg. in an adult weighing 60 Kg.) induces incipient experimental catatonia; in monkeys, a dose equivalent to dosage in man causes a marked degree of experimental catatonia.

In contrast, doses equivalent to 50 mg. in a man weighing 60 Kg. induce only sleep. These data are of considerable importance in establishing the therapeutic dosage in man. In cats, a dose equivalent to 175 mg. in a man weighing 60 Kg. causes inhibition of postural reflexes and absence of the rotation of the head reflex.

This shows the sensitivity to chlorpromazine.

**EFFECTS IN THE PHYLOGENETIC SERIES.** The most striking data in our experiments were the considerable differences between chlorpromazine activity in the lower order of the vertebrates and in the mammals. Bulbocapnine exhibits such differences but produces a satisfactory experimental catatonia. These differences are also noted with other substances producing experimental catatonia. In pigeons, catatonigenic pathologic bites cause a spectacular catatonia—the bird standing on one's shoulder does not move whether one jumps or dances—whereas chlorpromazine, even in very high dosage, has almost no effect in birds. The effects of chlorpromazine and especially the production of experimental catatonia are noted only in mammals, and the higher the order of mammals the more pronounced are the effects with a proportionately lower dosage (a maximum is obtained in monkeys).

In summary, chlorpromazine causes sleep, experimental catatonia, or paresis, according to dosage. Moreover, its action is not limited to psychomotor effects but extends to equilibrium and posture. This seems to indicate an affinity for the mesencephalon and centers related to posture and equilibrium. Nevertheless, this specific action on the mammal with a developed cerebral cortex shows that chlorpromazine also possesses a very important cortical activity. Therefore, chlorpromazine exerts an extensive psychic and neurological action. In addition, a study in monkeys by Baruk, Rougerie, and Lelord showed the activity of chlorpromazine on the cerebral circulation. These authors noted that, following an intravenous injection in an animal of 50 mg. of chlorpromazine, there was a flattening and pallor of the cerebral vessels, associated with a depletion of the cerebral circulation similar to that encountered after administration of insulin. During this stage, Verdeaux and Marty obtained an electrocorticogram of sleep in the animal.

**Total Extracts of *Rauwolfia serpentina*.** In monkeys, the injection of 100 mg. of the total alkaloids of *Rauwolfia* in a *Macaca rhesus* weighing 3.600 Kg. (equivalent to 1.14 Gm. in a man weighing 60 Kg.) produced lowered aggressiveness, slowing of activity, and sleep.

In cats, a dose of 88 mg. in a cat weighing 2.640 Kg. (equivalent to 2.33 Gm. in a man weighing 70 Kg.) caused paresis of the hind limbs and generalized tremor; the next day a syndrome of decerebrate rigidity occurred, with death occurring the day after.

In mice, sluggishness, coiling up, and convulsive movements were noted. In guinea pigs, there was a sluggishness lasting two or three days, and sometimes death occurred on the second or third day. In pigeons, a dose of 22 mg. of the total alkaloids in a pigeon weighing 660 Gm. (equivalent to 2.33 Gm. in a man weighing 70 Kg.) caused sluggishness and incipient catalepsy.

To sum up, administration of the total extracts of *Rauwolfia* does not always produce experimental catatonia, but with a high dosage animals show a certain degree of torpor,

occasionally accompanied by signs of decerebration. Toxic reactions are more prolonged than with chlorpromazine, eventually leading to death of the animal a few days later.

**THE LAW OF STAGES.** This is less definite with total extracts of *Rauwolfia* than with chlorpromazine. Degree of effect varies according to dosage, but there is no correlation with conditions having dissimilar features.

**THE EFFECTS IN THE PHYLOGENETIC SERIES.** The data from *Rauwolfia* are somewhat difficult to evaluate. Fish appeared somewhat resistant; cats appeared to be more sensitive than monkeys.

**Reserpine. ANIMAL PSYCHOPHARMACOLOGY.** The effects of reserpine are altogether different from those of total extracts of *Rauwolfia*, and in mammals a quite impressive and characteristic experimental catatonia is noted. Reserpine catalepsy is marked, and in monkeys postures of the limbs passively imposed are maintained with or without support. This is not seen in experimental catatonia from bulbocapnine or in most of the other varieties of experimental catatonia, except for ACTH experimental catatonia described by Baruk. For instance, a *Macaca rhesus* weighing 5 Kg., after receiving an intramuscular dose of 13.5 mg. of reserpine (equivalent to 189 mg. in a man weighing 70 Kg.), showed a severe catalepsy with fixed posture of limbs. The posture was maintained even when the animal was put into a cage that was moved about. The animal exhibited a fully flexed position with an *arc de cercle* posture. A highly emotional attitude was also noted, with negativistic stereotyped behavior. To sum up, reserpine induces a very complete and marked catatonia.

**THE LAW OF STAGES WITH RESERPINE.** With reserpine, the law of stages has a distinctive development: the first stage preceding catatonia is characterized by decreased aggressiveness and reactivity in the animal. This is chiefly marked in monkeys. Not only does the animal show a reduced reaction when one tries to catch it, but its usually strong feeling of solidarity towards its fellow monkeys decreases under the influence of reserpine. Nevertheless, it is not sleepy and is interested in the surrounding activities, even though aggressiveness is minimized and there is no fighting when it is caught in a net or attacked by another animal, contrary to what happened before the administration of reserpine. When a fellow monkey is seized, it does not go to the rescue as it did before reserpine administration. The cat also is unable to defend itself when clawed by another cat.

Following the catatonic stage, paresis is noted, which chiefly affects the hind limbs. In reserpine catatonia, this paresis of the hind limbs is probably responsible for the peculiar posture of the animal, which leans strongly on the forelegs with head forward. Staggering gait, diarrhea, considerable narrowing of the palpebral fissure, marked tremor, latero- or retropulsion, and occasional vomiting are frequently noted.

The same phenomena are observed in the guinea pig, mouse, and pigeon. They show catalepsy, marked tremor, neurovegetative disturbances with narrowing of palpebral fissure, frequency of defecation, diarrhea, and paresis.

**EFFECTS IN THE PHYLOGENETIC SERIES.** Less definite than those produced by chlorpromazine, the effects of reserpine are about the same, especially in birds and mammals, and do not show the same degree of variation in relation to the development of the central nervous system. Neurovegetative disturbances are particularly accentuated. Finally,

reserpine is more toxic than chlorpromazine. Several animals died (a cat, 19 1/2 hours after the injection, and numerous mice); monkeys recuperated very slowly, with sluggishness and prostration lasting for six to eight days following injection.

**Rescinnamine.** **ANIMAL PSYCHOPHARMACOLOGY.** An injection of 2.45 mg. of rescinnamine in a *Macaca rhesus* weighing 4.900 Kg. (equivalent to 0.50 mg./Kg. in man) caused early drowsiness interrupted by attacks of agitation and anxiety, generalized tremor, postural flexion, and catatonia. The "psychic pillow" sign was present. This characteristic clinical sign, which is noted in man, and which has never been observed in any other variety of experimental catatonia, is, at the present time, considered typical in rescinnamine experimental catatonia. A higher dosage injection of 0.9 mg. in a *Macaca rhesus* weighing 1.225 Kg. (equivalent to 0.73 mg./Kg. in man) induced a state of stupor with drooping lids, general muscular hypotonia, and respiratory disturbances. Death was observed 89 hours and 15 minutes following injection.

The injection of 10.07 mg. of rescinnamine in a cat weighing 3 Kg. (equivalent to 3.35 mg./Kg. in man) caused hypotonia collapse, paresis of the hind limbs, and later on paralysis of all four limbs, *arc de cercle* position, diarrhea, and defecation. The death of the animal occurred on the following day.

In a number of animals, especially in guinea pigs, rescinnamine caused an early impairment of the Magnus postural reflex and loss of the rotation of the head reflex (*reflexe de retournement*).

**LAW OF STAGES.** With rescinnamine, stages are less definite. Stupor often precedes catatonia, but the catatonic manifestations, such as drowsiness, tremor, and paresis, are often concomitant.

**EFFECTS IN THE PHYLOGENETIC SERIES.** Rescinnamine activity is similar in birds and mammals. The pigeon is very sensitive, showing catalepsy, tremor, fatal paresis, or occasionally a staggering gait. Mice also show a cataleptic state, rhythmic jerks, respiratory disturbances, or a narrowing of the palpebral fissure. In guinea pigs, as previously mentioned, postural reflexes are lost.

In summary, rescinnamine appears to be a very toxic and dangerous drug; it causes important neurovegetative disorders and toxic reaction, affecting various functions of the central nervous system, i.e., psychic functions, posture, motility, and the neurovegetative centers.

**N. 68 (Covatine).** N. 68 alone does not produce experimental catatonia in animals, but according to dosage it potentiates or inhibits the activity of chlorpromazine. When it is given in high dosage (30 mg./Kg.) with a low dosage of chlorpromazine (2.5 mg./Kg.), a very impressive experimental catatonia is seen. In contrast, N. 68 used in monkeys in low dosage (3 mg. or 7 mg./Kg.) in combination with a dose of chlorpromazine inhibits the catatonigenic action of chlorpromazine.

#### THERAPEUTIC DATA

Experimental findings in animals provide valuable data for human therapy.

We also studied effects on human beings of chlorpromazine, prochlorperazine, total

extracts of *Rauwolfia*, and reserpine. Extensive studies on each of these agents were carried out with a large number of patients and with prolonged follow-up observations, including a series of biological and physiological clinical studies on the action of each substance on temperature, pulse, oscillometric index, arterial blood pressure, sedimentation rate, hematology, electrocardiography, weight, biological constants (glycemia, azotemia, and so on), and finally on the psychomotor function. Graphic routine recording of the psychomotor initiative curve and fatigue curve by means of the Mosso ergograph was performed.

New chemotherapies were initially suggested by sleep therapy, the rest cure of the central nervous system, and hibernation. The initial trend was based on the assumption that a powerful action on the central nervous system is needed, an action that will produce narcosis rather than sleep. As we have often emphasized, there is a difference between true sleep similar to physiological sleep, from which the subject can be awakened easily and promptly, and narcosis, in which slowing of psychic processes and obnubilation of a toxic origin are present. Scopochloralose is a typical drug for true sleep therapy; in the dosage used in our studies it induces a mild transitory sleep that can be prevented if the subject so desires, as in normal sleep. It is a medication for relaxation and resting of the cerebral cortex, as is demonstrated by physiological data.<sup>53, 54</sup> A complete monograph on this therapy will be found in the thesis of Joubert.<sup>55</sup>

In contrast, medications commonly available in the name of sleep therapy comprise a mixture of numerous hypnotics. Indeed the use of these medications could be called a toxic rest therapy involving potentiation and disconnection phenomena.

In our opinion, it is useless and sometimes dangerous to potentiate a sedative or an hypnotic with another sedative or hypnotic. The demonstrative experiments which we performed in monkeys have been described.<sup>55</sup> Clinically, we also noted accidents in man when this method was used. On the other hand, because of the importance of toxic factors in the genesis of psychosis, the use of toxic combinations for sedation of certain symptoms produces but a transitory sedation followed by reinforcement of the actual disorder or the occurrence of new ones. For these reasons, we ourselves, as well as Delay and Deniker, gave up the use of the potentiation methods and the so-called sleep therapy with combined medications.

As far as "disconnection" or "neuroplegic action" is concerned, the physiological studies did not confirm these notions; in relation to this matter Gayral writes: "The term neuroplegia has an acceptance more symbolic than objective." With regard to the term "narcobiosis," a notion acquired from Decourt, following his studies on chlorpromazine, and corroborated by experiments on unicellular organisms, it represents a view in general physiology rather than a clinical fact. We have already pointed out that narcosis should be differentiated from both sleep and sedation, and that in man and in animals it manifests itself by a marked obnubilation of a toxic origin exceeding the sedative effects and has an altogether different meaning.

Moreover, to ascribe to a drug a single action without careful evaluation is not a safe procedure. As an example, scopochloralose in low dosage produces a typical, mild, and reversible sleep, and in high dosage it may produce narcosis and mental disorders. Of course the latter are not sought for.

The conception of the law of stages according to dosage is very important. We demonstrated its value in the course of our experiments on animals. Thus we were able to establish for each drug the toxic doses causing either experimental catatonia, extrapyramidal disorders, or neurovegetative disturbance, and we noted that with each of the drugs studied these three manifestations occurred in variable degree. However, it seems that the extrapyramidal and neurovegetative disturbances caused by reserpine are more accentuated than those caused by chlorpromazine. We do not refer to rescinnamine, which we found very toxic and do not use clinically. Reserpine has a toxic action more prolonged than chlorpromazine, which has a mere transitory action and on the whole appears less toxic. The main problem to be resolved in therapy is to know whether a toxic effect is to be sought to produce some kind of psychic upset that results in a therapeutic action, or, on the contrary, whether it is better to use a subtoxic dosage. We believe that the latter method is best and that the higher dosage of neuroleptics, combination of neuroleptics with other medications, or combination of neuroleptics is frequently responsible for the unfavorable reactions pointed out by some authors.

With regard to administration of chlorpromazine, we never exceed a total parenteral dose of 150 mg. daily, divided into three injections, and this we use only in attacks of acute manic psychosis. We never exceed the oral administration of 300 or 400 mg. daily, divided in two doses. On the other hand, prolonged administration of such doses is contraindicated, and we apply an interrupted therapy, using a small initial dosage that is increased to a selected plateau and reduced thereafter. This therapy is pursued at most during three to four months with chlorpromazine and reserpine, and for a longer period when the total extract of *Rauwolfia* is used.

In addition, therapeutic regimens should be established according to the individual case: it is only in an acute manic attack or in severe compulsive states that a high dosage or a massive dose may be required to obtain a sedative and symptomatic action. However, in many psychoses, chlorpromazine may have a remarkable action on the basic ego mechanisms, hallucinations, incoherence, and delusions. In such cases, initial dosage should be low, increasing gradually to an adequate dosage. There is for each individual patient an optimal dose that frequently causes symptoms to disappear; if it is reduced, there is a resumption of symptoms.

For instance, since January, 1951, we have treated a woman who had severe hallucinations, incoherence, paranoid reactions, marked disturbances in behavior, and withdrawal tendencies, and who was in constant need of supervision. The patient was under the care of her daughter-in-law, who remarked after tentative dosages that the optimal dose was 80 drops of chlorpromazine given in the morning and at night. This dosage has been maintained without interruption for two years. Examination of the patient shows a complete transformation of her condition: her hallucinations and delusions have disappeared; her thoughts are coherent; she leads a normal life, takes an interest in life, meets with friends, goes to the theater, movies, and so on. However, when the dosage is reduced, she is less coherent and some of her other symptoms recur.

In some cases we noted that the inhibiting or maintenance dose could be very low and

that, even in the schizophrenic patient, a satisfactory condition might be maintained with a dose of 20 to 30 drops given twice a day. The problem that remains to be solved is to establish the duration of maintenance therapy. Relief or complete cure may persist after discontinuation of treatment with chlorpromazine. However, in such cases, the question arises whether the condition is an atypical periodic psychosis or a hypomanic atypical state, on which chlorpromazine exerts a remarkable action. Though chlorpromazine is less effective in depressive states, it is not without effect on some of them. In such cases and in atypical depressive states the total extracts of *Rauwolfia* give good results, though a prolonged therapy may be necessary since recurrence of disorders is frequently noted on discontinuance of medication. Total extracts of *Rauwolfia* are also of value in the treatment of obsessive ruminative states.

Reserpine is valuable mainly in catatonia and in some depressive states with special asthenia in which chlorpromazine is not effective.

One of the most interesting ways to evaluate the therapeutic effects of these drugs is the psychomotor initiative curve, using the Mosso ergograph. It is most interesting to see the remarkable improvement and regulation of the effective psychomotor initiative and the improvement of the ergograms paralleling the clinical improvement when adequate dosage is given.

Such findings would seem to be in opposition with observations of other investigators who ascribe to neuroleptics the occurrence of psychomotor initiative disturbances. Le Guillant<sup>56</sup> describes a condition that he calls the neuroleptic syndrome as "a disturbance of voluntary movements with regard to their spontaneity, rapidity and accuracy—briefly, a psychomotor disorder." Such disorders have been recorded only when dosage was too high and therapy too prolonged. In another clinic, Launay and Despatures<sup>57</sup> saw an important series of patients slowed up and rigid, following prolonged treatment with chlorpromazine. An analysis of the respective clinical and pharmacologic tests of the extrapyramidal and psychomotor syndromes showed that the incidence of the psychomotor syndrome was higher. There should not be any confusion between this and the other series.

As already mentioned, we noted in the course of our animal experiments that the incidence of extrapyramidal or organic-like syndromes, due to increased toxic phenomena and higher dosage, was higher than the psychomotor symptoms. With reference to the mechanics of action of the neuroleptics, it can be assumed that it is a diffuse cortical and mesencephalic action. However, the proportion of one of the two elements varies according to the drug used.

#### RESUMEN

En este trabajo se presenta una revisión de los datos clínicos y fisiológicos experimentales, sobre la catatonía. Además de los dos estados orgánicos resultantes en la catatonía, uno relacionado con las lesiones localizadas del cerebro y el otro con los trastornos psicogénicos hay un tercero causado por agentes tóxicos: drogas, meningoencefalitis tuberculosa alérgica, toxina neurotrópica de *Bacillus coli*, obstrucción artificial del lumen intestinal, ligadura de

la arteria hepática, fístula de Eck, asfixia, factores endocrinos y edema cerebral. Se destacan los factores tóxicos hepatointestinales.

La producción de catatonía en animales utilizando neurolépticos, se describe también en este trabajo. La ley de las fases (variación en los efectos —sueño, catatonía y parálisis— a dosis variadas) se aplica también a los neurolépticos. Se ha observado que la catatonía experimental sólo puede producirse en los vertebrados superiores.

La mayoría de los nuevos quimoterápicos producen narcosis más bien que sueño fisiológico. Se exponen la conducta y consecuencias fisiológicas de estos agentes como una fase de la farmacología de los neurolépticos. La principal decisión a adoptar en la terapia neuroléptica es la elección entre una dosis tóxica que produce un trastorno psíquico que puede dar por resultado una acción terapéutica y una dosis subtóxica. Los autores se muestran partidarios de usar dosis subtóxicas y un tratamiento interrumpido. Asimismo se expone la especificidad de los neurolépticos en varias afecciones.

## RESUME

Les données cliniques et expérimentales concernant la catatonie sont passées en revue. Outre les deux conditions de l'organisme entraînant la catatonie, l'une en relation avec des lésions cérébrales localisées, l'autre avec des troubles psychiques, il y en a une troisième dépendant de facteurs toxiques: drogues, méningo-encéphalite tuberculeuse allergique, toxine neurotrope du *Bacillus coli*, obstruction artificielle de la lumière intestinale, ligature de l'artère hépatique, fistule de Eck, asphyxie, facteurs endocriniens, oedème cérébral. L'importance des facteurs toxiques hépato-intestinaux est soulignée.

La production de catatonie chez l'animal à l'aide de neuroleptiques est décrite. La loi des stades (variation dans les effets—sommeil, catatonie, paralysie—suivant les diverses doses) est bien démontrée avec les neuroleptiques. Les auteurs notent que la catatonie expérimentale ne peut être produite que chez les vertébrés supérieurs.

La plupart des nouvelles chimiothérapies produisent la narcose plutôt que le sommeil physiologique. Les conséquences entraînées par ces agents, sur le plan du comportement et de la physiologie, sont discutées en tant que phase de la pharmacologie des neuroleptiques. La principale décision à prendre en thérapeutique neuroleptique est le choix entre une dose toxique provoquant un trouble psychique et qui peut avoir une action thérapeutique et une dose subtoxique. Les auteurs sont d'avis d'utiliser la dose subtoxique et le traitement discontinu. La spécificité des neuroleptiques dans diverses conditions est commentée.

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# Dynamics in a Case of Obesity

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This paper describes the case of a 13 year old obese girl whom the author saw in psychoanalytically oriented psychotherapy 19 times over a period of eight months. The case demonstrates that a single symptom, obesity, can be used to express simultaneously instinctual wishes, fantasies, fears, and defenses, stemming from every level of the psychosexual development.

## HISTORY

Betsy was a girl of superior intelligence (I.Q. 123) and had a good academic record. When treatment started, she was 100 per cent overweight; she was 5 ft. 2 in. tall and weighed 219 lb.

Pregnancy and birth had been normal. Betsy was breast-fed for two weeks, then bottle-fed, and at six or eight months weaned from the bottle. At the father's insistence, the infant was taken to a pediatrician who was a food faddist and did not believe in giving canned baby foods. Everything Betsy ate had to be freshly ground by her mother, who resented this chore. Betsy always was a good eater.

Toilet training started at one year, was quite strict, and was completed at age 3, but from the age of 3 or 4 Betsy frequently suffered from constipation. When she was 5 she had a tonsillectomy. From 6 months to 4 years, her care was largely in the hands of her maternal grandmother because the mother was working. The family lived during this period in the grandmother's home. Betsy was an alert, motorically active child and could recite many nursery rhymes at 3 years.

At the age of 6 years, the patient was 65 per cent overweight but had no endocrine disturbance and had a normal metabolism. Placed on a diet, she lost 20 lb. in five months, which brought her down to a weight within near normal limits, and she was discharged from medical care. At age 9.9 years she was again referred to a clinic, 67 per cent overweight. On a 1500 calory diet, her weight dropped from 133 to 121 lb. in 3 months, after which time the parents withdrew her from medical supervision.

This was very shortly after Betsy had started to menstruate (at age 9½) and to reach physical sexual maturity, which seemed to be an important factor in explaining the parents' ambivalence about helping her to reduce. They could hold her to the diet when she was 6 years old, but when she began to mature they appeared unconsciously to obstruct medical and psychological treatment. When Betsy started psychotherapy at age 13, she was also suffering from dysmenorrhea.

The father, who referred Betsy for treatment, told the intake worker in his initial contact

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over the telephone that he was putting a lot of pressure on the patient to diet, as he had a certain ideal for her in mind and wanted her to lose 100 lb. During the first diagnostic interview, he elaborated on this ideal, which he self-righteously expected his daughter to meet. He said he remembered what he thought was a nice looking "gal" when he was 18, and he wanted Betsy to look like that. He wanted her to weigh 125 lb. and "would like to reap the fruits." He added that he would tell the psychologist something that would "make her hair stand on end": "I can't stand to kiss my daughter." He also told the social worker that the patient frequently was constipated, and, as "this is a subject dear to my heart," he would tell her more about it: "When Betsy is able to go to the toilet, she has a stool that is so large it practically clogs the toilet."

The father, 39 years old, was a large man, but not obese. He apparently watched his diet. His mother and sisters were overweight, and he detested obese people. A milkman who delivered milk mainly to taverns, he frequently would make Betsy accompany him on his route, take her into some of the taverns, and dance with her to the tune "The Object of My Affection Changes My Complexion." Emotionally, he seemed to be quite a sick man, rather close to a psychotic break.

The mother was 40 years old, an attractive, slender, wiry, rather petite woman, who dressed nicely but in some vague way managed to give the impression of looking like a college girl. She had high school education and, with the exception of a few months around Betsy's birth, was in business with her aunts until Betsy's younger brother was born. She was tense, anxious, and markedly immature; too childlike to meet her husband's needs as a wife. She spoke much more warmly of her father than of her husband. She reported that even when she attained adulthood she was still her father's "little girl."

The patient was seen at the Institute for Juvenile Research. In accordance with this clinic's policy of treating both the child and the parent(s), the mother received collaborative therapy from another staff member. Throughout, she showed resistance to collaborative treatment and her role in it and a jealous desire to be seen by the child's therapist. The father simply refused to accept therapy for himself.

Bill, the patient's 6½ year old brother, was the mother's favorite. The parents did not consider him to have any problems even though they said that he "does not eat at all."

#### THErapy

From the beginning, Betsy appeared overly friendly and eager for therapy. She showed an enormous pressure of speech and a desire to talk entertainingly, as if she needed to ingratiate herself with the therapist. On the other hand, there were frequent cancellations of hours.

In the first hour, after the purpose and general procedure of therapy had been discussed with Betsy, she said that she was proud of being in therapy now. She immediately told the therapist that she had lost weight during the summer at her aunt's house but regained it at home. After bringing up some sibling rivalry material in connection with her little brother and denying jealousy quickly, Betsy suddenly told the therapist that a stillborn baby girl was born to her parents when she was 5 years old—an important detail that the parents

had not mentioned. She followed by saying that, when this child was born, her mother told her something about where children came from, and two years later, when her brother Bill was born, the mother told her "everything one needs to know about sex, so I couldn't get in trouble." After this disclosure she said that her mother was buying her maternity clothes because they fitted her better than ordinary clothes. When asked how she felt about that, she said, "It's perfectly OK—I'm not pregnant, and that's all that matters." A little later she said she had stretchlines on her abdomen, "like a pregnant woman."

Betsy also stated in this first hour that her father rewarded her for not taking second helpings at dinner by giving her banana splits heaped with whipped cream at bedtime. In a later hour, after again referring to these banana splits, she free-associated that a boy had once called her a "cocksucker." That Betsy had an unconscious pregnancy fantasy seemed clear. Connected with this pregnancy fantasy, apparently, there was an unconscious felatio fantasy with her father and the idea of oral impregnation.

The theme of pride (with which she had opened and closed the first hour) prominently turned up again in the second, sixth, and seventh hours, usually as a denial of shame (e.g., "I am so proud of the fact that all the boys at school call me 'handicapped' or 'precious' instead of 'fat.' They all want to have pictures of me.") A related theme running through almost all of the first 10 hours was Betsy's excessive need to be popular and to be loved by everyone, and her fear—or probably consciously denied knowledge—that this was not a fact. She boasted of having "millions of friends," both boys and girls, who, she said, insisted on her coming to every party. "They say it just is not a good party unless I am around." Actually she never was invited to a boy-girl party.

In the fourth hour, Betsy said that she never got sick—(denial—fear of weakness). However, she reported that sometimes she had "nervous headaches" during which she was nauseated, had to vomit, and her right arm became numb. In addition, she frequently had trouble with her eyes, not only at the times of the migraine bouts. She thought she often saw only half of an object or could not see the corner of an object. The last time the migraine and numbness in the arm occurred had been on Easter, when she was standing in front of the church congregation and was supposed to recite. She said she had been looking forward to this with great excitement, but migraine forced her to leave the rostrum.

Thus, it became apparent that the patient might turn to hysterical defense symptoms when she would reduce and when the fat no longer, like an armor, would protect her against unconscious exhibitionistic tendencies.

A few days later, Betsy woke up in the night with migraine and numbness in her arm. Asked in the following hour whether she remembered any dreams preceding this migraine attack, she said she did not but told two other dreams:

*Dream 1.* Some time ago she dreamt that she was in the movie with her girl friend. There were couchlike seats, some of them facing towards the large screen and some of them facing backwards towards a TV screen that was installed in the theater. The picture that was shown on the big screen in front was the same as the one that was shown on the TV screen in back. Betsy was facing forward, her girl friend facing backward; they were languidly lying beside each other, and both saw the TV and the movie screen simultaneously.

*Dream 2.* In the second dream, Betsy saw a bird that looked something like a hawk, but it was not as large

as a hawk, and it had a claw protruding from its throat. It was a bird that preys on smaller birds. It had babies (Betsy corrected herself: it had eggs). The hawklike bird took the eggs one by one and dropped them into the lake. It would never kill the babies but just drop them into the lake. There were a number of men who shot at the hawklike bird, but the bird did not die. It, too, dropped into the lake. The men jumped into the lake after the bird, but they never came up again.

The first dream is a girl-gender-oriented dream that may be homosexual at some level. Except for the Rorschach, which showed slight homosexual trends, it was the only homosexually tinted material the patient ever brought up. All the rest of the material throughout therapy showed clearly heterosexual interests. She was looking both forward, towards adolescence and heterosexuality, and backward to the normal "homosexual" period of sharing interests with other girls, i.e., the second half of the latency period. Of this period she had been deprived through her premature sexual development. She turned back to it longingly because she had missed out on it, and also because she was not yet ready to face adulthood and heterosexuality. The dream thus depicted her conflict in age and sex. (The couchlike seats should not be interpreted as referring to the transference situation. Betsy was never put on the couch; in fact, there was no couch in the treatment room.)

The second dream suggested a good deal of hostility, confusion about the whole topic of reproduction and sex, and deep despair about getting any of this straightened out. The mother—or what Betsy feared she herself would be when she became an adult woman—was the hawklike bird that was not as large as a real, male hawk. She had aggressive-destructive characteristics—a claw protruding from her throat—and preyed on younger birds. (Betsy's mother always pried into Betsy's affairs, opened her mail, and so on.) She would never kill babies but would drop them into the lake (the stillborn sister). She was seen as inducing (seducing) men to shoot at her (intercourse) and to jump into the lake (uterus) after her, where they would die. They would "never come up again."

Other important factors became clear in the sixth and seventh hours. Betsy said that her mother, who was 40 years old, looked like 20, whereas she herself could be taken for anything from 18 to 25 years. She halved her mother's age and nearly doubled her own. Her fear of being as attractive as her mother and its connection with the obesity (defense against the desire to compete with the mother in looks) were interpreted to her. Betsy said, "Now it's getting hot; now we're really talking about something."

In January, 1952, for the first time the patient doodled in the hour; until then, she had consistently refused to play, doodle, or draw. She drew a picture of a clumsy car, which she called "a hot-rod car having a 1930 chassis with a 1952 motor." Through this picture she was now able to let the therapist know how afraid she was of her own sexual impulses' running away with her and that she defended herself against these impulses by making herself nonstreamlined (obese) and over 20 years old. She also voiced clearly in this and the following hours her great ambivalence about losing weight. She now felt freer to talk about real feelings and did not need to keep so much to the superficial pretense that everything was funny. She became conscious of feelings of resentment towards her parents and complained that they did not want her to go out with boys her own age unless they knew the boy and his family well. However, she said, when a customer of her father's got fresh

with her on the telephone and asked her to go to bed with him, her father had refused to listen to her complaint and to protect her.

When Betsy had been in psychotherapy for six weeks, the advisability of concomitant diet restriction under medical supervision was discussed with the family. The parents agreed but tried to prevent collaboration between the physician and the psychologist. Furthermore, they often encouraged Betsy to skip appointments with the internist as well as with the psychotherapist or made her baby-sit at the times of her appointments.

Betsy slowly became conscious of one of the hostile-aggressive components in her overeating. She reported many times that she would cheat on her diet whenever she had been scolded by her parents or when they had unjustly accused her of some misdeed. In the eleventh hour she said, "I think in such cases I eat to get revenge on them." And after a while: "But I can see now that that is stupid; I hurt myself more by overeating than I hurt them." This was real insight. Though the patient often, during the second half of therapy, needed to defend her parents' actions immediately after having complained about them, she recognized clearly the ways in which they obstructed treatment and encouraged her resistance.

One of the most striking examples of covert parental obstruction of therapy occurred around the fifteenth hour, when Betsy had lost  $7\frac{1}{2}$  lb. in the two preceding weeks and had come close to the magic 200 lb. line. The father suddenly went on a competitive diet with Betsy, telling her daily that he could lose more weight than she could. He induced a 25 year old woman, Sylvia, to take part in this "race not to let Betsy win." (The patient hinted that Sylvia was one of the father's girl friends.) The father also forgot to have Betsy's prescription for appetite-reducing pills refilled.

In the twelfth therapy hour, the patient reported that her dysmenorrhea had subsided practically completely, but that she now craved food most strongly during her menstrual periods.

The patient still had a pronounced need to boast about heterosexual activities. "No girl my age has ever gone out with as many boys as I have." Her tales sounded as if she were actually very provocative with boys. However, it became more and more apparent that most of her boasting was based on wishful thinking and fantasy rather than on reality.

Betsy continued having difficulty in accepting praise for something she had done well, particularly in school, that is, in front of boys. This covered her unconscious fear of being seductive and irresistible. Similarly, her layers of fat served as a defense against exhibitionistic tendencies.

In the sixteenth to eighteenth hours, Betsy gave a great deal of material, although at times she manifested a tendency to withhold again. She showed evidence of some identification with the therapist. Formerly she had wanted to become a lawyer or a physical education teacher. Now she wanted to become a psychologist, inquired about projective tests, and advised her uncle to take his disturbed wife to a psychiatric clinic. On the other hand, she also fantasied about a foster home for children she would own and run when she would be grown up. Apparently she unconsciously thought this would enable her to enjoy vicariously the feeling of being mothered.

During the nineteenth hour Betsy talked about her impending graduation from elementary school. She said she had bought her graduation dress the day before. It was a size 23, in the style of junior dresses, only wider. Before therapy she used to wear large adult dresses, size 42, or maternity dresses. The new dress, she said, was a beautifully young dress. When she tried it on in the store, the salesgirl had said to her, "Now you don't need to look mature and old before your time." The therapist responded, "That is exactly what we have been working on here for a long time. Until now you have always felt that your mother looks like 20 and that you could be taken for a 25 year old. Now you are beginning to feel that you are really not a mature, adult woman nor that you need to be one yet. You also realize now that being your own age can be fun." Betsy laughed and said, "Yes, now that I am getting thinner I can see that I don't need to look like 25, and that I act too grown-up for my own sake. You know, I weigh  $199\frac{3}{4}$  lb. now."

After this hour, the parents abruptly withdrew Betsy from treatment. The mother stated that Betsy was a "good girl" and therefore no emotional factors requiring psychotherapy were involved in her obesity.

Here the circle closed towards the first hour in which Betsy echoed her mother's feelings about her by saying: "I am not pregnant, and that's all that matters." Being a good girl meant not getting pregnant.

Betsy's opinion about continuation of treatment was apparently not asked. Termination was the parents' decision. It must have come as an abrupt surprise to Betsy. Nothing in the last hour indicated that she wanted or expected to terminate. Several attempts at persuading the parents to let Betsy continue in psychotherapy met with failure. Medical therapy with the internist was broken off by the family a couple of weeks later.

#### DISCUSSION

That food equals love has practically become an axiom in psychoanalytic literature. Many investigators have found that the obese person craves to be loved and substitutes food for the maternal love he is longing to receive.<sup>1-3, 5, 6, 11</sup> Often, overeating also has been found to be an oral-aggressive act, a symbolic attempt to wrench love from the mother who did not give it.<sup>5, 11, 12</sup> In some cases it expresses destructive wishes against the frustrating opponent.<sup>8</sup> Besides the meaning of the symptom at the oral level, several authors<sup>1, 3, 4, 7, 11</sup> have pointed out that obesity also can be a patient's defense against his sexual desires or the expression of an unconscious oral impregnation and pregnancy fantasy.<sup>4, 9, 11</sup> The anal level components in obesity have received less attention so far. Lehman<sup>7</sup> treated a 7 year old obese girl in whom retention of feces seemed to express the unconscious desire for pregnancy.

The hypothesis advanced through the case of Betsy is that a single somatic symptom—obesity—can be used to express simultaneously unconscious instinctual wishes, fantasies, fears, and defenses against anxiety, stemming from each and all levels of psychosexual development.

*The Oral Level.* OBESITY AS AN EXPRESSION OF ORAL-RECEPTIVE NEEDS. On the early oral-dependent level, Betsy sought gratification for her unfulfilled needs through overeating.

Her mother did not give to her willingly in infancy, breast-fed her for 2 weeks only, hated to prepare baby food for her, and went out to work, leaving her in the care of the grandmother. For the love she could not get from her mother, Betsy substituted its primitive equivalent, food. In adolescence, when old conflicts were revived and the conscious desire to be popular (i.e., to be loved) surged up, she again resorted to overeating. Her fear of being unloved was now mixed with shame, which she tried to deny through pride about the peculiar, freakish status that her fat body gave her among her peers.

**OBESITY AS AN EXPRESSION OF ORAL-AGGRESSIVE DRIVES.** On the oral-aggressive level, the overeating seemed to represent a reprisal against the mother's unwillingness to give to the patient during infancy. Betsy was taking through overeating. The hostile meaning became clear in Betsy's cheating on her diet after every quarrel with her mother. This was symbolic cannibalism. In her anger, she apparently wanted to annihilate her mother through devouring her.

*The Anal Level.* Betsy had a 10 year history of broad vacillations between constipation and exceedingly large bowel movements. She may have withheld hostilely and have been unable to "give" normally because her mother never willingly gave to her. At other times, she produced a great amount of feces, probably expressing in an archaic way a desire to give. Through the anal mechanism, the girl expressed stubborn resistance towards her parents as well as a desire to please them. She certainly pleased her father, who talked about the large stools as "a subject dear to my heart."

A similar broad vacillation between retention and overproduction was found in the patient's therapy. She swung from a tremendous need to produce psychoanalytic material to withholding material, denying, and skipping hours—and to overproduction again.

Retentions of stool also were connected with a pregnancy fantasy. It seemed that in the patient's unconscious fantasy feces were equated with the fetus received through oral impregnation by means of eating. Through withholding bowel movements, she could distend her abdomen so that it would look like that of a pregnant woman.

*The Genital Level.* **OBESITY AS A DEFENSE AGAINST OBJECTIVE ANXIETY.** On the oedipal level, the obesity was a defense against the father's incestuous wishes, which frightened Betsy. The father's wishes were very close to the surface. He talked about the girl as few fathers would speak of their 13 year old daughters. At the onset, he informed the interviewer that he could not stand to kiss his daughter. In appearance he wanted her to be like the first girl he had loved. Once she had reduced and had become attractive, he intended to "reap the fruit." He took this 13 year old girl to taverns where he always danced with her to a suggestive sexual song of his own choosing. He was extremely jealous of every boy in whom Betsy became interested but refused to listen to Betsy's complaint when one of his own contemporaries made an indecent proposal to her.

Only one previous investigator<sup>6</sup> found that the fathers of some of his obese female patients behaved seductively towards their daughters, either overtly or covertly, and were jealous of their daughters' contacts with other men. Fathers of obese girls are usually described as weak, passive, inadequate, or unimportant in the family constellation, as having little drive—apparently including sexual drive—and as being dominated by their wives.<sup>1, 2, 8</sup>

In Betsy's case the family constellation was quite different. The father was the strong, domineering, primitively earthy, seductive, aggressive member of the family. The mother was more cultured and refined, but infantile and anxious, and rejecting of her daughter. In addition, she was submissive but frigid in her relationship to her husband.

**OBESITY AS A DEFENSE AGAINST INSTINCTUAL ANXIETY.** Obesity occurred for the first time when Betsy was  $4\frac{1}{2}$  years old, i.e., in the oedipal period. At age  $6\frac{1}{2}$  it subsided with dietary supervision. When Betsy prematurely developed and started to menstruate at the age of  $9\frac{1}{2}$ , obesity recurred. It eventually reached large proportions when the patient emotionally had become adolescent.

From these historical data alone, one might be justified in inferring that Betsy was fearful of the strength of her own sexual desires. During the oedipal period, the wish to have sexual relations with the father frightened her. Later, with the sudden ascension of instinctual energy that is a characteristic concomitant of pubertal maturation, warded-off drives were remobilized, and the patient feared she might sexually stimulate her father as well as boys her own age. This inference is sustained by much of the material she brought up during therapy. She said repeatedly that her father should not think "it" could not happen to her, meaning sexual acting out. She drew the picture of a clumsy hot-rod car that had an old-fashioned chassis but a high-powered modern motor. The fat that made her unattractive protected her against her own exhibitionistic-seductive tendencies and from giving in to her sexual drive and desires.

**OBESITY AS A DEFENSE AGAINST THE DESIRE TO COMPETE WITH THE MOTHER.** In making herself fat, Betsy tried to eliminate herself as an oedipal rival to her slender, good-looking mother. She feared that if she became attractive she would irretrievably lose the pre-oedipal mother's love for which she craved. Betsy thought that her mother, who was 40 years old, looked like 20, and that she herself, because she was "so big all around," looked as if she were 25 years old. The very infantile mother did not protect Betsy from her fear of competition on the oedipal level but aided and abetted it. She pushed the girl towards the father in a position ahead of herself. For example, she wore Betsy's clothes, after having had them cut down to her own slender size, and traded her adult evening blouse for Betsy's early teen-age beanie. Instead of allaying the child's instinctual fear of competing with the mother on the sexual level by showing the daughter that she would not give up the father to her, the mother added fuel to this fear through her behavior. Betsy defended herself against the fear by becoming fat and unattractive.

**OBESITY AS THE UNCONSCIOUS EXPRESSION OF A PREGNANCY FANTASY.** The earliest onset of Betsy's obesity coincided with a pregnancy of the mother, which resulted in a stillborn baby when Betsy was 5 years old. Betsy told the therapist about this stillbirth in the first hour. She also stressed that she wore maternity clothes and had stretchlines on her abdomen "like a pregnant woman." All this indicated clearly that the girl had an unconscious, perhaps even preconscious, pregnancy fantasy.

The mother's pregnancy at the apex of Betsy's oedipal phase and the stillbirth of the first sibling are of prime importance for the dynamic understanding of this case. Driven by her oedipal desires, Betsy fantasied that she, and not the rival mother, was carrying the father's

baby. In competition with the mother, she started to become "fat," which to her meant pregnant. Then the mother had a stillbirth. She brought no baby home. In Betsy's fantasy, the father had not given a baby to the mother but to her, Betsy. Her mother was slender again and had no infant in her arms. That proved it in the small child's mind. Betsy still was fat. Unconsciously, she determined to stay fat, fondly retaining the fantasy that she was bearing her father's baby. She would not give it up for the duration of the oedipal period.

When Betsy matured sexually, the repressed fantasy returned and she again expressed it through the symptom of obesity. In her associations, she connected the banana splits the father gave her with her having been called a cocksucker.

Thus, the overeating, on the genital level, appeared to be determined by a fellatio and oral impregnation fantasy, the exceedingly large, formed stools seemed to represent a fantasy of giving birth by anus, and the obesity served as an unconscious expression for the co-existing fantasy that the patient had as yet not delivered the (stillborn) baby.

All the different internists who treated Betsy at various ages found no endocrine or metabolic factors that could have caused the obesity. In view of the obesity in the father's family, constitution and heredity were considered as possible etiological factors. However, Rynearson and Gastineau,<sup>10</sup> who made a comprehensive survey of the literature, state in their textbook that there is no definite evidence for the importance of heredity in obesity.

Betsy's obesity was, in the main, the resulting somatic expression of unconscious fantasies and of cravings on the different progressive levels of psychosexual development. In the timeless chaos of the unconscious, they all coexist. The unconscious frequently does not discard the instinctive longings characteristic of an earlier level of development when the next developmental step is reached.

The patient's symptom was also her defense, particularly on the genital level. Through it, she warded off anxiety.

Regressive features have been discussed at length in this paper. However, the integrative ego functions of this patient should not be underestimated. They were quite well developed. Betsy made excellent use of her intellect. She was one of the best students in her class, had good judgment, and was a friendly person who, in general, related well. She was jolly, had a good sense of humor, and in many ways was able to enjoy life. The patient's good ego strength was probably due to the fact that the maternal grandmother, the most normal person in this very disturbed family, had a major part in taking care of the child during the ages of 6 months to 4 years. Thereafter, she always retained a lively interest in the girl's welfare and continued to be a beneficial influence.

#### SUMMARY

The paper describes the case of a 13 year old, prematurely sexually developed obese girl (height 5 ft. 2 in., weight 219 lb.) who was seen in psychoanalytically oriented psychotherapy 19 times over a period of eight months. The mother was an infantile person who unconsciously rejected the girl; the father was promiscuous and had strong incestuous wishes

towards his daughter. His personality was an even greater pathogenic factor in the patient's illness than that of the mother. The parents obstructed and resisted therapy throughout and withdrew the patient from treatment abruptly when her weight had dropped just below 200 lb.

The case was presented for its dynamic interest. It suggests that obesity can have its dynamic roots on each and all levels of the psychosexual development. The data pointed to a multiple network of dynamic determinants on every level. On the oral and anal levels, obesity somatically expressed the girl's infantile wants and her need for gratification of instinctual desires. On the genital level it represented a defense against objective and instinctual anxiety. Simultaneously, the symptom also expressed unconscious oral, anal, and sexual fantasies.

Although the material the patient produced was rich, the formulation of the dynamics and etiology of the obesity in this case must remain tentative because the patient stayed in therapy for only 19 hours. Dynamics can become apparent in a small number of hours, but in order to be fully confirmed they need to be demonstrated again and again by means of the repetition compulsion in the long-term therapy-life of the patient. Future research along these lines, with patients of the same symptomatology, is indicated.

## RESUMEN

Se describe el caso de una niña obesa de 13 años, con desarrollo sexual prematuro, que pesa 100 Kg. y mide 1,63 m. tratada con psicoterapia, orientada psicoanalíticamente en 19 sesiones en un período de ocho meses. La madre era una persona de mentalidad infantil que inconscientemente rechazaba a su hija; el padre era un hombre promiscuo y con fuertes tendencias incestuosas hacia su hija. Los padres dificultaban y se oponían al tratamiento de la niña, hasta el punto de interrumpirlo abruptamente cuando el peso de la paciente había descendido a 91 Kg. El caso sugiere que la obesidad puede tener sus raíces dinámicas en todos los niveles del desarrollo psicosexual; los datos revelan una múltiple red de determinantes dinámicos en cada nivel. En los niveles oral y anal, la obesidad expresaba somáticamente las necesidades de la paciente por satisfacer los impulsos de su instinto. En el nivel genital, la obesidad representaba una defensa contra la ansiedad objetiva e instintiva. Simultáneamente, la sintomatología también expresaba, inconscientemente, fantasías de naturaleza oral, anal y sexual. Aunque los datos proporcionados por la paciente eran abundantes, la formulación de los dinamismos y la etiología de la obesidad en este caso, fueron sólo especulativos ya que la paciente sólo recibió 19 sesiones de tratamiento. Los dinamismos se pueden hacer aparentes en un pequeño número de horas de tratamiento, pero para que puedan ser completamente confirmados se necesita demostrarlos una y otra vez por medio de compulsiones repetidas en el curso de una terapia tan prolongada como la vida misma del paciente.

## RESUME

Description d'un cas de développement sexuel prématuré chez une fille obèse âgée de 13 ans dont la taille était de 1m57 et le poids de 99kg. La malade a été soumise à 19 séances de

psychothérapie à orientation psychanalytique pendant une période de huit mois. Cette fille était inconsciemment rejetée par une mère infantile et le père, un débauché sexuel, témoignait de tendances incestueuses prononcées envers sa fille. Les parents montraient de la résistance au traitement et y faisaient obstacle pendant toute sa durée. Ils ont interrompu brusquement le traitement quand le poids de l'enfant est tombé au-dessous de 90kg. Ce cas suggère que l'obésité pourrait avoir ses racines dynamiques à tous les niveaux du développement psychosexuel; les données indiquaient un réseau multiple de déterminants dynamiques à chaque niveau. Au niveau oral et anal l'obésité exprimait somatiquement les besoins infantiles de la malade et son besoin de satisfaire ses désirs instinctuels. Au niveau génital elle représentait une défense contre l'anxiété objective et instinctuelle. Le symptôme exprimait aussi simultanément les phantasmes oraux, anaux et sexuels.

En dépit de la richesse des informations obtenues chez cette malade, la dynamique et l'étiologie de l'obésité n'ont pu être définies que de façon approximative, étant donné que la malade n'avait eu que 19 heures de psychothérapie. Il suffit d'un petit nombre d'heures pour que le dynamisme devienne apparent, mais sa pleine confirmation ne s'obtient que par sa démonstration constamment renouvelée au moyen de la compulsion répétitive durant un traitement à long terme du malade.

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# Methacholine Reaction Indices as Prognosticators for Insulin Coma Therapy

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Reactivity to methacholine chloride has been studied in recent years with respect to relationship to clinical change following various forms of treatment. Funkenstein et al<sup>1, 4</sup> have reported its prognostic value for electroconvulsive treatment, and Pasquarelli et al<sup>3</sup> have equated the pattern of response to this drug to the adequacy of affect and clinical outcome for 68 hospitalized psychiatric patients treated by psychotherapy.

In various studies reported,<sup>1, 3, 4, 6, 8</sup> systolic blood pressure reactivity to epinephrine has usually been assessed along with its reactivity following the injection of methacholine. Pasquarelli, however, found that the use of epinephrine in addition to methacholine did not add to prognostic efficiency. The question of the accuracy of systolic blood pressure changes has been raised by Palmer,<sup>7</sup> who points out that blood pressure changes are influenced by many extraneous variables, e.g., the position of the subject's arm and the placement of the cuff. The value of the methacholine chloride reaction could perhaps be enhanced if additional and more stable indices were utilized. Thus, pulse rate changes might provide a more stable indication of the cardiovascular change effected by methacholine.

Gelhorn<sup>5</sup> has viewed the methacholine reaction as a measure of hypothalamic sympathetic activity. Altschule<sup>2</sup> has emphasized that the methacholine reaction measures the reactivity of some autonomic ganglia and the activity of enzymes that inactivate or destroy the drug. Penfield and Jasper<sup>9</sup> have found that the hypothalamic ganglia function as control centers for sweating, salivation, shivering, pupillary, and vasomotor changes. Accordingly, measures of change in these areas following injection of methacholine might serve as additional or alternate indices of prognosis.

The present study aimed at assessing the prognostic value of the methacholine reaction for insulin coma therapy. The emphasis was on its relationship to improvement immediately after treatment rather than on the long-range effectiveness of treatment. In addition to utilizing systolic blood pressure changes, diastolic blood pressure and pulse rate changes and such effects as sweating, salivation, flushing, shivering, and pupillary changes were utilized as potential prognostic indicators. An additional index employed was serum cholinesterase levels that were obtained through laboratory tests. This was thought to be potentially useful since according to Altschule<sup>2</sup> the pattern of physiological response to methacholine chloride is presumably determined by the rapidity of inactivation of the drug by the enzyme cholinesterase.

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## PROCEDURE

A series of 125 schizophrenic men consecutively referred for insulin coma therapy was utilized. Most of these subjects were recent admissions, and their ages ranged from 19 to 46 years. Prior to commencement of insulin treatment, each patient was given a 10 mg. injection of methacholine chloride into the deltoid muscle shortly after awakening in the morning. Immediately prior to these injections, basal systolic and diastolic blood pressure readings and pulse rate measurements were taken. Changes in pulse rate and systolic and diastolic blood pressure measurements were gauged at 2, 5, 7, 10, 12, 15, and 20 minutes following the injection. During this observational period, the severity and duration of sweating, salivation, flushing, shivering, and pupillary changes were separately rated on a five point scale with gradations ranging from no change to marked responsiveness. Ratings were by agreement of two of the authors who had previously worked as a team for a considerable period and therefore had established relatively similar frames of reference for judgment.

A number of these patients were not introduced into insulin coma therapy, since family approval was not forthcoming. Previous empirical observations had suggested that the average maximum improvement of patients occurs at approximately the fortieth insulin coma. Accordingly, only those patients who had completed 39 or more comas were included in that aspect of the study dealing with prognosis for insulin coma therapy. A total of 75 subjects was thereby obtained. All such subjects were rated for improvement on a similar five point scale by a third author, in charge of the insulin clinic, who had no knowledge of these patients' responsiveness to methacholine chloride.

## RESULTS

For purposes of analysis, insulin improvement rating scale scores of 0 and 1, reflecting either no or minimal improvement were grouped and contrasted to scores of 2, 3, and 4, categorized as indicating moderate through marked change. Deviations of pulse rate and systolic and diastolic blood pressure readings at various intervals following the methacholine chloride injection were biserially correlated with the two insulin improvement categories. Results are presented in table I. It can be seen that both pulse rate and systolic blood pressure deviations from basal measurements are significantly correlated to extent of change, whereas diastolic blood pressure deviations bear no relationship to insulin improvement. Pulse rate deviations generally show higher correlations than systolic blood pressure measurements. The magnitude of correlation for both variables rises to a peak and then diminishes as the time interval following drug injection increases till, at 20 minutes, neither variable remains significantly correlated with insulin coma improvement. Thus pulse rate deviation at seven minutes and systolic blood pressure variation at either 7 or 10 minutes show the greatest relationship. The maximum pulse rate deviation during the entire 20 minute observational period, though of a lower magnitude, shows a significant degree of relationship to improvement. Maximum systolic blood pressure deviation, however, is not significantly correlated with insulin improvement.

## METHACHOLINE REACTION AND INSULIN THERAPY

TABLE I  
Biserial Correlations of Insulin Improvement and Cardiovascular Variables

	Time interval following methacholine injection					Maximum change
	5'	7'	10'	12'	20'	
Pulse rate deviations	0.51*	0.63*	0.49*	0.36*	0.16	0.37
Systolic blood pressure	-0.28†	-0.34†	-0.38*	-0.30†	-0.11	-0.23
Diastolic blood pressure deviations	0.00	-0.13	0.01	-0.09	-0.01	-0.07

\* Significant at  $P_{01}$ .

† Significant at  $P_{05}$ .

Chi square analyses of the relationship of the various methacholine reactivity ratings to insulin improvement categories disclosed that significant differences at the  $P_{05}$  level of confidence were present for such variables as sweating, salivating, flushing, and global reactivity. This indicates that subjects undergoing at least moderate response to methacholine were differentiated from the others in improving most in insulin coma therapy. This relationship was not found for the variables of shivering and pupillary change. Relationships between sweating, salivating, flushing, global reactivity, insulin improvement categories, and pulse rate and systolic blood pressure deviations are shown in table II.

The global methacholine reaction ratings and pulse rate deviations at seven minutes correlate highest with immediate insulin improvement. The other variables show a lesser relationship. Sweating, salivating, and flushing are substantially correlated with each other, and each shows a high degree of relationship to the global ratings. Although pulse rate and systolic blood pressure deviations at seven minutes are both expressions of cardiovascular dynamics, they bear a low negative relationship to each other. Since these two variables are objective measurements as compared to the relative subjectivity of the four methacholine reaction ratings, a multiple correlation coefficient of +0.68 was determined

TABLE II  
Intercorrelations of Various Methacholine Reaction Indices

	Insulin improv.	Systolic B.P. dev., -7'	Pulse rate, dev. -7'	Sweating	Salivating	Flushing
Systolic B.P., dev. -7'	-0.38*					
Pulse rate, dev. -7'	0.63*	-0.20				
Sweating	0.42†	-0.34	0.41			
Salivating	0.42†	-0.22	0.40	0.76		
Flushing	0.42†	-0.35	0.45	0.73	0.62	
Global rating	0.70†	-0.48	0.42	0.86	0.86	0.82

\* Biserial correlation.

† Tetrachoric correlation.

between them and insulin improvement categories. With insulin improvement category designated as  $X_1$ , systolic blood pressure deviation at seven minutes as  $X_2$  and pulse rate deviation at seven minutes as  $X_3$ , the following regression equation whereby insulin improvement is predicted from the other two variables was obtained:

$$X_1 = -0.02X_2 + 0.08X_3 + 0.53.$$

The multiple correlation between insulin improvement ( $X_1$ ), pulse rate deviation at seven minutes ( $X_2$ ), sweating ( $X_3$ ), salivating ( $X_4$ ), and flushing ( $X_5$ ) was determined to be +0.66 and the accompanying predictive regression equation as

$$X_1 = 0.07X_2 + 0.07X_3 + 0.11X_4 + 0.05X_5 - 0.17.$$

Since these two multiple correlations of 0.68 and 0.66 are not significantly greater than the correlation of 0.63 for pulse rate deviation at seven minutes, the sole use of the pulse rate variable ( $X_2$ ) for prediction of insulin improvement is justified. The predictive equation is

$$X_1 = 0.08X_2 + 0.07.$$

No significant difference was found between improved and nonimproved subjects for cholinesterase delta pH units in a chi square analysis. A biserial correlation of +0.02, essentially zero, was determined for the degree of relationship of these two variables.

Funkenstein et al<sup>3,4</sup> and Pasquarelli et al<sup>5</sup> have sorted subjects receiving the methacholine chloride test into systolic blood pressure groups based upon certain descriptive data and have related membership in these groups to subsequent improvement. A similar grouping of subjects was made in this study. Following Pasquarelli and Funkenstein, groups I and IV, II and III, and V and VI were utilized as classifications. Of 73 subjects for whom sufficient data were available, 36 were classified as falling within groups II and III, 28 as belonging to groups V and VI, and only 2 as representative of groups I and IV. Seven subjects could not be classified reliably into these groups. Since too few subjects of groups I and IV were available, this category was omitted from further analysis. Chi square analysis revealed that a significantly greater number of category V and VI subjects showed substantial improvement following insulin therapy than of category II and III subjects ( $P_{0.1}$ ). Seventy-one per cent of groups V and VI subjects showed significant improvement, whereas only 39 per cent of groups II and III displayed a like change. A tetrachoric correlation coefficient of +0.49 was found for the relationship of these two subject categories and insulin improvement categories.

#### DISCUSSION

The results suggest strongly that the methacholine chloride test of the autonomic nervous system has prognostic usefulness for immediate improvement in insulin coma therapy. The commonly utilized variable of systolic blood pressure changes following the injection of methacholine was of significant prognostic value, although it bore the lowest relationship to insulin improvement of a number of methacholine reaction indices. Simple ratings of easily observable autonomic phenomena, such as sweating, salivating, and flushing, were equal in

prognostic value to systolic blood pressure changes, and a global rating of reactivity was far superior. This last, however, involves considerable subjectivity and may show variation between judges. For this reason, the pulse rate variable, which is relatively objective and is more reliable than blood pressure readings, is probably the best index. Its use led to more accurate predictions of improvement than the use of systolic blood pressure groups as employed by Funkenstein and others. The finding that subjects of this study falling into systolic blood pressure groups V and VI tend to improve under insulin treatment, whereas a less favorable prognosis exists for subjects of groups II and III, is similar to prognostic findings reported by others for electroconvulsive therapy and psychotherapy. If the findings of this study can be cross-validated on a new sample of subjects experiencing insulin coma treatment, they would suggest that the use of the pulse rate variable in place of systolic blood pressure changes might increase predictability for these other types of treatment. Furthermore, the usefulness of the methacholine chloride test for prognosis in these treatment approaches suggests that it should be investigated with respect to potential utility for treatment with ataractic drugs.

## SUMMARY

Various methacholine chloride reaction indices for a group of 75 schizophrenic subjects about to undergo insulin coma therapy were investigated with respect to their prognostic power. Pulse rate and systolic blood pressure deviations after seven minutes from basal rates and such ratings of autonomic phenomena as sweating, salivation, flushing, and global reactiveness were found to be significantly related to insulin improvement. Because of its objectivity and the magnitude of its relationship to insulin coma therapy improvement, the pulse rate index was determined as being most valuable. A comparison of the prognostic efficiency of this index and Funkenstein systolic blood pressure group indices disclosed that the pulse rate deviation variable again had a higher correlation with subsequent insulin therapy improvement.

## RESUMEN

Se investigaron los índices de diversas reacciones al cloruro de metacolino experimentados por un grupo de 75 esquizofrénicos que debían tratarse con coma insulínico, con el objeto de establecer qué valor pronóstico podían ofrecer. Se halló que estos índices guardaban estrecha relación con la mejoría producida por la insulino-terapia. Entre estos índices figuran la frecuencia del pulso y las variaciones de la presión sistólica después de siete minutos del establecimiento de valores básicos. También figuran entre estos índices los fenómenos autónomos tales como sudoración, salivación, enrojecimiento de la piel y reactividad general. En virtud de su objetividad y de la magnitud de su relación con la mejoría producida por el coma insulínico, el índice constituido por la frecuencia del pulso fue considerado como el más valioso en cuanto a pronóstico. Comparando el valor pronóstico de este índice con el del grupo de índices de la presión sistólica de Funkenstein se pudo establecer de nuevo que la variación de la frecuencia del pulso guarda una relación mucho más estrecha con la mejoría resultante de la insulino-terapia que los demás índices.

## RESUME

Les différents indices de la réaction au chlorure de methacholine ont été étudiés chez un groupe de 75 sujets schizophrènes devant être soumis au coma insulinique, à l'égard de leur valeur pronostique. On a observé une corrélation significative entre les écarts de la vitesse du pouls et de la pression sanguine systolique au bout de 7 minutes par rapport aux taux de base et l'ampleur des phénomènes autonomes tels que la salivation, la sudation, la congestion faciale, la réactivité globale et l'amélioration due à l'insuline. En raison de son objectivité et de l'importance de sa corrélation avec l'efficacité du traitement par le coma insulinique, l'indice de la vitesse du pouls a été établi comme le plus adéquat. Une comparaison entre la valeur pronostique de cet indice et les indices de groupe de la pression sanguine systolique de Funkenstein a révélé que la variable de l'écart de la vitesse du pouls avait encore une corrélation plus marquée avec l'amélioration succédant au traitement insulinique.

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# A New Procedure for the Administration of Carbon Dioxide

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The use of carbon dioxide inhalations was first reported in 1925 by Lovenhart et al.,<sup>2</sup> who used 40 per cent carbon dioxide in oxygen mixtures in treating psychotic patients.<sup>1</sup> The next use of this form of therapy was reported in 1937 by Kerr et al.,<sup>2</sup> using a 30 per cent carbon dioxide in oxygen mixture in treating neurotics who manifested anxiety states. In 1948, the use of 20 to 30 per cent carbon dioxide in oxygen mixtures in a large variety of neurotics was reported by Meduna.<sup>3</sup> In 1952, La Verne<sup>4</sup> reported a rapid coma technique in which a higher concentration of carbon dioxide, 40 to 80 per cent in oxygen mixtures, was used. Today, the slow and rapid coma techniques are the treatments of choice in carbon dioxide therapy.

## SLOW COMA TECHNIQUE OF MEDUNA<sup>5</sup>

A mixture of 30 per cent carbon dioxide and 70 per cent oxygen is allowed to flow into a large rubber breathing bag holding about 5 liters. As soon as the bag is full, a mask is applied to the patient's face, which permits him to breathe the mixture through a closed system. He is instructed to breathe deeply with the mouth open and is allowed to take between 15 to 25 breaths, which is the amount that is generally necessary to bring about coma. The number of breaths varies from patient to patient, some requiring more and some less. The mask is then removed from the face, and the patient blows off carbon dioxide quickly because of hyperventilation. It generally takes about three minutes to produce coma, and the return to consciousness requires two minutes, the entire procedure taking a total of five minutes.

To counteract the anxiety some patients develop at the beginning of treatment, Meduna<sup>6</sup> administers 100 per cent nitrous oxide from 20 to 30 seconds before the carbon dioxide mixture. In those patients who develop a fear of treatment because of the horrifying dreams resulting from the therapy, he administers pure nitrous oxide at the coma stage.

## RAPID COMA TECHNIQUE OF LA VERNE<sup>4</sup>

Looking for a way to overcome the anxiety and fear of the multiple breath technique, La Verne found that if he used concentrations of 70 to 95 per cent carbon dioxide in oxygen he could minimize these effects.

The patient is instructed to inhale forcibly and to exhale. Then he is instructed to take a deep breath, forcibly exhale, and hold his breath. The mask with the mixture in an 11 liter breathing bag is placed on the patient's face, and he takes a deep inspiration and again holds his breath. The mask is removed, and coma or subcoma is produced. The patient

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blows off carbon dioxide by hyperventilation, and consciousness rapidly returns. Unconsciousness takes eight seconds and return to consciousness 22 seconds. The entire procedure takes 30 seconds.

La Verne<sup>7</sup> has modified his procedure so that he now uses: (1) Single breath technique; (2) single breath technique with voluntary breath holding; (3) multiple breath rapid coma technique preceded by nitrous oxide anesthesia; (4) multiple breath rapid coma technique preceded by partial nitrous oxide anesthesia (subcoma).

#### TECHNIQUE DEvised AT THE MANHATTAN VETERANS ADMINISTRATION HOSPITAL

In interviewing patients who were undergoing carbon dioxide therapy, the author was impressed by the number who complained of the anxiety they experienced when anticipating treatment or while getting treatment. This was brought about by the application of the mask to the face or by the fear that they would choke when breathing carbon dioxide and oxygen mixtures in a closed system. This was true of both the multiple breath method of Meduna and the rapid coma techniques of La Verne.

With this in mind, another procedure was evolved in an attempt to eliminate the complaints, a procedure in which nothing would be directly applied to the face and in which the therapeutic gas would be effective when mixed with air in unknown concentration.

The patient is instructed to inhale and exhale with mouth open. Pure carbon dioxide gas is administered through a large plastic mask having a broad surface that can be held above the mouth and nose of the patient so that it does not touch the face. The height can be varied from patient to patient depending on the concentration of the gas the therapist desires to administer. Coma or subcoma can be produced in short or longer periods of time as the therapist desires.

#### ADVANTAGES OF THE MANHATTAN VETERANS ADMINISTRATION HOSPITAL TECHNIQUE

Therapeutic effects of this procedure seem to be as effective as the techniques of Meduna<sup>5</sup> and La Verne.<sup>4</sup> Undesirable effects, such as treatment anxiety, fear of treatment, or air hunger, are still further reduced. Because he is breathing in an open system, the patient does not feel that he is being overpowered by the inhalations. Concentrations of carbon dioxide can be varied as desired while treating the patient. The method of administration is simple, and the equipment is inexpensive, requiring only a tank of CO<sub>2</sub>, manometer, rubber tubing, and mask.

#### CONCLUSIONS

Patients receiving carbon dioxide therapy complain about the anxiety they experience in anticipating and while getting treatment. Anxiety can be partially eliminated by giving pure carbon dioxide gas without applying a mask directly to the face. The patient receives pure carbon dioxide gas and air in varying concentrations that can be controlled as the

therapist desires. It has been found that this method produces therapeutically effective results as compared with other methods (slow coma technique of Meduna and rapid coma techniques of La Verne) in neurotic and mildly psychotic patients.

## RESUMEN

Los pacientes tratados con anhídrido carbónico se quejan de la ansiedad que experimentan antes y durante la terapia. La ansiedad puede eliminarse parcialmente haciendo inhalar el gas de anhídrido carbónico puro, sin aplicar directamente la máscara a la cara del paciente. En esta forma, el enfermo recibe el gas puro de dióxido de carbono y el aire en concentraciones variables que pueden graduarse a voluntad del médico. Se halló que este método produce resultados terapéuticamente eficaces, en comparación con otros métodos (coma lento de Meduna y coma rápido de La Verne), en pacientes neuróticos y ligeramente psicóticos.

## RESUME

Les malades traités par le  $\text{CO}_2$  se plaignent de l'angoisse éprouvée par anticipation et pendant le traitement. Cette angoisse peut être partiellement éliminée par l'administration de  $\text{CO}_2$  pur sans application directe d'un masque sur le visage. Le malade reçoit un mélange de  $\text{CO}_2$  pur et d'air à diverses concentrations, qui peuvent être réglées comme le désire le thérapeute. On a constaté que, par comparaison avec les autres méthodes (techniques du coma lent de Meduna et du coma rapide de La Verne), cette méthode donnait des résultats efficaces du point de vue thérapeutique dans les psychonévroses ou les psychoses modérées.

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# Atropine Coma Therapy

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The application of multiple periods of atropine-induced coma as a somatic therapy for mental illness was introduced by Forrer in 1950. Subsequent refinements in procedure and clarification of indications for treatment have further increased the effectiveness of atropine coma therapy in emotional disorders. It has proved to be a very safe and technically simple therapeutic procedure.

Atropine sulfate is an organic ester of an aromatic acid and a complex organic base. Its pharmacological action is accomplished through its blocking of the utilization of acetylcholine. Rebound hyperactivity of the sympathoadrenal system appears to result from this blocking of acetylcholine utilization. Both central and peripheral effects are observed. The principal peripheral signs of atropine action are mydriasis, cycloplegia, inhibition of salivation and respiratory secretions, relaxation of peribronchial musculature, tachycardia, inhibition of sweating, decrease in tone and peristalsis in the gastrointestinal tract, and increase in sphincter tone. The central pharmacological effects of atropine where the dose is high enough are restlessness, delirium, delusions, hallucinations, and coma. The precise mechanism of action in the production of these responses is far from clear but presumably related to the blocking action on acetylcholine. Human electroencephalographic studies reveal an increase in amplitude and a decrease in frequency and, in animals, eserine-induced spiking is abolished. Animal studies reveal the highest concentration of atropine in the cerebral and cerebellar cortices, with smaller amounts in other central neuron cell aggregates. It appears probable that such localized high concentrations of atropine are closely correlated with the central effects of this drug.

Candidates for therapy are selected on clinical criteria not easily determined as to extent or degree. Therapeutic success, in our experience, is directly proportional to the degree of anxiety the patient suffers. Regardless of diagnostic category, we consider that patients suffering greatly from anxiety have the best prognoses with atropine coma therapy. We have observed that patients with relatively strong egos respond more effectively than those whose ego defenses are weak. In our experience, the clinical status of the patient, the strength of his ego, and the degree of anxiety with which he suffers are far more important prognostically than either diagnostic category or duration of illness. Currently defined contraindications to therapy appear to be infections (especially chronic otitis media and sinusitis), peptic ulcer, myasthenia gravis, severe cardiovascular disease, severe liver disease, glaucoma, and depressive reactions.

Treatment is initiated by the intramuscular administration of 32 mg. of atropine sulfate, this dosage being progressively elevated subsequently so that the third stage of coma is achieved despite a gradually developing tolerance for the drug. Our highest single dose has been 208 mg., or approximately 100 times the amount of atropine sulfate conventionally

prescribed. We administer treatment four times a week. During the last year we have had the medication administered at 3:00 a.m. so that patients will have recovered sufficient motor control to enable them to eat lunch and participate in organized ward activities during the afternoon and evening.

After the intramuscular injection of atropine sulfate, progressive neurophysiological regression follows smoothly and without disruption to the third stage of coma. This induction period lasts 30 to 60 minutes. The various stages are passed through quietly and comfortably. Neurologically, these are, in order, progressive muscular incoordination, decreased pain sensitivity, and hyperreflexia with development of the Babinski sign. On the psychological side, we observe clouding of the sensorium, disorientation, loss of time-space relationship, distortion of perception with illusions and hallucinations, confusion, and coma that precedes to but does not go further than the early fourth stage in one and one half hours after the drug is administered.

Although the sensorium is markedly clouded, there is no cessation of psychological phenomena. Patients undergoing treatment indicate by their actions, and occasionally by word, that psychic processes continue even during the coma. Illusions seem to be experienced, inasmuch as patients attempt to pick up the bed clothing with their fingers and later report that they saw, and attempted to pick up, flowers, bugs, snakes, and so on. Conversations may be held with absent persons—indicative of an hallucinatory state. With both atropine-induced illusions and hallucinations, highly significant past events in the patient's life seem to provide the major psychic stimuli. Behavior is correlated with psychological phenomena. Circumoral movements, including sucking, illusory "eating," and "smoking," are commonly observed. When a sufficient degree of motor coordination is retained to accomplish the necessary movement, a progressive, coordinated, and purposeful series of events may often be observed. For example, a pantomime of striking a match, lighting a cigarette, and subsequently smoking of that cigarette is not infrequently observed. Affective lability and corresponding rapid alternation of facial expressions suggestive of pain, sadness, querulousness, and euphoria are commonly observed.

Recovery is spontaneous, the reverse order of the march of events described previously being passed through. The sensorium has completely cleared six to nine hours after the injection.

Pulse, blood pressure, respiration, and touch estimations of temperatures are charted during the treatment period. Any elevation of temperature is accurately checked by thermometer. It seems desirable, if not necessary, to maintain a relatively dehumidified room atmosphere so as to enhance the cooling effects of that sweating that does occur. Ice water sponges are used if temperatures exceed 102 F. rectally. If there is associated hyperactivity, amobarbital sodium ( $3\frac{3}{4}$  grains) is administered intramuscularly. Once normal temperature has been achieved by this procedure, we have not observed temperature elevation again during the same treatment. The frequency of hyperthermic responses has been 1 in every 400 treatments. Although it has never been required, immersion in an ice water tub would be appropriate in the management of intractable hyperthermia. Eserine ointment ( $\frac{1}{4}$  per cent) is placed in the conjunctival sacs every three hours to prevent cycloplegia.

We should like to present our findings in the treatment of 206 mentally ill patients. The criteria for evaluation of results were as follows: (1) Patients were considered worse if they were more difficult to care for and demonstrated regression of mental status. (2) They were rated unimproved if there were no significant changes in behavior pattern or mental status following a course of therapy. (3) They were rated slightly improved if they were capable of three out of four of the following: living on a more comfortable ward; being more amenable to routine care; carrying out a new assignment or previous assignment at a higher level of integration; decrease in psychotic thought content. (4) They were rated moderately improved if they demonstrated all of the above plus definite or partial decrease of psychotic behavior or content of thought but still required hospitalization. (5) They were rated markedly improved if they satisfied all the criteria listed plus the ability to live outside the hospital, or if they demonstrated, clinically, complete remission and returned to their pre-psychotic level of adjustment.

Table I shows the relationship between therapeutic efficacy of atropine coma therapy and duration of illness. Fifty per cent of patients whose illness had lasted less than one year were markedly improved; 40 per cent of those having psychotic symptoms for one to two years were markedly improved; and 42 per cent of patients having psychotic symptoms from 2 to 15 years, or more, showed marked improvement. The majority (71 per cent) of the patients had had psychotic symptoms for more than two years, the maximum duration of illness being 35 years. Twenty-eight of the 206 patients (14 per cent) had had psychotic symptoms of one to two years' duration. Thirty patients (15 per cent) had had overt psychotic symptoms for less than one year prior to the initiation of therapy. This confirms a previous observation that the duration of illness is of no significance in prognosticating the effects of atropine coma therapy.

One hundred and fifty-three (74 per cent) of patients received chlorpromazine in dosages ranging from 100 to 1000 mg. a day, both before and during atropine therapy. We feel it cannot be emphasized strongly enough that none of this group of patients treated with atropine coma therapy had benefited to any noticeable degree from the administration of chlorpromazine prior to treatment by atropine coma therapy. Fifty-three patients (26 per cent) treated with atropine coma therapy received no tranquilizing drug at all during their hospital stay. When this latter group was compared with the group treated with

TABLE I  
*Length of Illness and Result of Treatment*

Duration	No. of patients	Unimproved		Slightly improved		Moderately improved		Markedly improved	
		No.	%	No.	%	No.	%	No.	%
0 to 1 year	30	11	36	2	7	2	7	15	50
1 to 2 years	28	12	44	2	5	4	11	10	40
2 years +	148	45	30	19	13	24	15	60	42

chlorpromazine prior to and during treatment with atropine coma therapy, we found no statistical or clinical differences that suggested that the chlorpromazine was of any benefit. Sixteen patients (8 per cent) received electroshock therapy following atropine coma therapy. This modification seemed desirable when agitation masked a depression that became overt after the agitation had been relieved. Eight of these 16 patients recovered or were markedly improved. This finding substantiates earlier observations that atropine coma therapy is of no benefit in depressive psychotic reaction.

Tables II and III present the results of atropine coma therapy immediately after the termination of therapy and six months thereafter. Table III seems to be of some significance, particularly when one observes that 85 patients (42 per cent) were on convalescent status six months after the termination of atropine coma therapy. Of these, all were markedly improved according to the criteria we adhered to. It is our observation that the factor of selection has improved therapeutic results threefold over original observation by Forrer in unselected patients.

In an effort to determine any significant relationship that might be present between clinical status and the beneficial effects of atropine coma therapy, we considered two groupings of the 206 patients. In one group we placed those patients who gave clinical evidence of anxiety, tension, and agitation. In the other group we placed those who gave clinical evidence of flattening of affect, depression, and hostility. In Table IV it can be seen that, of the 86 patients in group I, only 28 per cent showed no, or slight, improvement; whereas, in group II, 56 per cent of the patients demonstrated only slight or no improvement. It seems abundantly clear that rigid adherence to the criteria suggested above would result in a more dramatic statistical improvement ratio. Had prognostic evaluations been based

TABLE II  
*Type of Illness and Immediate Result of Treatment*

Diagnostic category	No. of patients	Unimproved		Slightly improved		Moderately improved		Markedly improved	
		No.	%	No.	%	No.	%	No.	%
Psychoneuroses	24	2	8	2	8	6	25	14	59
Manic depressive psychosis:									
Manic	7	0	0	1	14	3	42	3	42
Depressed	5	2	40	0	0	2	40	1	20
Schizophrenia:									
Undifferentiated	66	23	34	12	18	12	18	19	30
Catatonic	3	1	33	1	33	0	0	1	33
Paranoid	63	21	32	10	15	12	18	22	35
Mixed	1	1	100	0	0	0	0	0	0
Schizoaffective	20	5	25	3	15	3	15	9	45
Simple	1	1	100	0	0	0	0	0	0
Psychosis (all other)	14	5	36	2	14	5	36	2	14
Totals	206	60	29	31	15	43	21	72	35

TABLE III  
Result Six Months post Treatment

Diagnostic category	No. of patients	Unimproved		Slightly improved		Moderately improved		Markedly improved	
		No.	%	No.	%	No.	%	No.	%
Psychoneurosis	24	10	43	3	12	3	12	8	33
Manic depressive psychosis:									
Manic	7	0	0	0	0	0	0	7	100
Depressed	5	2	40	1	20	2	40	0	0
Schizophrenia:									
Undifferentiated	66	20	29	7	11	10	15	29	45
Catatonic	3	0	0	0	0	0	0	3	100
Paranoid	65	22	34	8	14	10	15	25	37
Mixed	1	1	100	0	0	0	0	0	0
Schizoaffective	20	5	25	3	15	1	5	11	55
Simple	1	1	100	0	0	0	0	0	0
Psychosis (all other)	14	7	50	1	7	4	29	2	14
Totals	206	68	32	23	12	30	14	85	42

solely on the criteria of manifest anxiety and ego strength, rather than on general clinical impressions, prognostic accuracy would have been considerably increased.

Atropine coma differs from the corresponding level of insulin coma by the fact that, despite a marked neurological regression, clinical features such as conjugate deviation, tremors, hyperkinetic symptoms, and complete loss of pain sensation do not occur. During

TABLE IV  
Relationship of Affect and Treatment Results

Affect	No. of patients	Unimproved		Slightly improved		Moderately improved		Markedly improved	
		No.	%	No.	%	No.	%	No.	%
Anxious	54	12	22	3	5	5	10	34	63
Tense	18	6	33	0	0	2	11	10	56
Agitation and guilt	14	2	14	0	0	2	14	10	72
Total	86	20	23	3	5	9	11	54	61
Flat	57	20	35	8	14	13	21	16	30
Depressed	46	14	31	11	24	8	18	13	27
Flat and hostile	17	14	88	1	6	0	0	2	12
Total	120	48	40	20	16	21	17	31	27
Grand total	206	68	33	23	11	30	14	85	42

induction there is a predictability of response and lack of discomfort for the patient that is in marked contrast to the frequently stormy induction period of insulin coma therapy.

It is our observation that the use of atropine to produce a safe and controlled level of coma provides for a functional reduction in ego and superego activity. In this state of clouded sensorium, the patient expresses the affective components associated with threatening, repressed memories and impulses. The affective discharge of this repressed material impresses us as being akin to an abreaction. Concurrent with the physiological detoxification of the atropine, re-repression of the ego-alien psychological material occurs, having, during the coma period, been partially freed from its affective components. This dissipation of the affective components of the repressed material seems to reduce the psychic pressure of the repressed to again enter consciousness. The ward programs, subsequent to recovery from each atropine coma, seem to provide a focus for more mature interpersonal relationships and more integrated psychic functioning. Although the patient's fundamental personality structure remains essentially unchanged, anxiety is markedly reduced as a result of treatment and, subsequently, there is frequently developed a greater capacity for more effective reality orientation. The increased libido, available to the ego, makes possible ego gratifications within a framework of reality that previously was not utilizable.

#### CONCLUSIONS

Forty-two per cent of patients receiving atropine coma therapy improved markedly and were out of the hospital six months post treatment. The most important criteria in the selection of patients who will respond to atropine coma therapy are the presence of anxiety, tension, and agitation. Length of illness and diagnostic category are not significantly related to the effectiveness of atropine coma therapy. This therapy is, in the authors' experience, virtually specific in terminating manic attacks and has a high order of effectiveness in obsessive compulsive reaction, this being not so much due to diagnostic category as to the agitated, tense quality of the affects in these clinical states.

#### RESUMEN

El 42 por ciento de los pacientes tratados mediante coma atropínico mejoró en forma notable. Los enfermos fueron dados de alta a los seis meses del tratamiento. El criterio más importante en la selección de los pacientes que pueden responder a la terapia de coma por atropina, son la presencia de ansiedad, tensión y agitación. Ni el diagnóstico ni la duración de la enfermedad están significativamente relacionados con la eficacia de la terapia de coma atropínico. Este tratamiento es, de acuerdo con la experiencia de los autores, virtualmente específico para eliminar los ataques maniacos; además, es de gran eficacia en las reacciones obsesivo-compulsivas, no teniendo mucho que ver con el tipo del diagnóstico y sí con la agitación y tensión que se observan en estos casos clínicos.

#### RESUME

Quarante-deux pour cent des malades soumis au coma atropinique thérapeutique se sont améliorés rapidement et sont sortis de l'hôpital six mois après le traitement. Les critères

le plus importants dans la sélection des malades aptes à répondre au traitement par le coma atropinique sont la présence d'angoisse, de tension nerveuse et d'agitation. Il n'y a pas de corrélation significative entre la durée de la maladie, la catégorie diagnostique et l'efficacité du traitement par le coma atropinique. Selon l'expérience de l'auteur, ce traitement est virtuellement spécifique pour mettre fin aux crises maniaques et il possède un haut degré d'efficacité dans la réaction compulsion-obession, ce qui est moins dû à la catégorie diagnostique qu'à la qualité de tension et d'agitation des affects dans ces états cliniques.

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# Experiences in the Use of Promazine in Hospitalized Chronic Psychotic Patients

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This is a report of experiences with promazine,\* chemically 10-( $\gamma$ -dimethylamino-*N*-propyl)-phenothiazine hydrochloride, in the treatment of chronic hospitalized psychotic patients. So far as we know, prior reports of its use have been made only in the treatment of relatively acutely disturbed mental patients.

Ninety-seven patients, 47 men and 50 women, were selected from two services comprised of chronic hospitalized patients. Selection was made primarily on the basis of assaultive or disturbed behavior. In some instances, however, selection was made on the basis of lack of improvement or change over a period of years. Most of the patients had not responded to various other forms of treatment, including insulin subshock, histamine, cortisone, pipradrol hydrochloride, pentamethylenetetrazol, electroshock, and prefrontal lobotomy. The newer ataractic drugs had been used in 34 patients.

The study was planned to cover a period of six months. It was not undertaken specifically as a research project but rather to evaluate the effectiveness of promazine in treatment of chronic psychotic patients. The studies on both groups were conducted independently. In both instances new ward groups were created with constant personnel. Special activities (occupational therapy, ward games, walks in groups, and so on) were encouraged. Privileges were granted during the course of the study to those able to handle them.

The average age of the patients was 40.8 years, ranging from 22 years to 66 years. Twenty-four patients were Negro and 73 white. The average length of hospitalization was 10.6 years. Of the total group of patients, 88 were diagnosed as schizophrenic reaction; 2, central nervous system syphilis; 2, psychotic disorder, undifferentiated; 1, chronic brain syndrome associated with alcohol; 1, chronic brain syndrome with diseases of unknown cause with psychotic reaction; 1, psychotic reaction with mental deficiency; and 2, manic depressive psychosis.

In the men's service, groups of approximately 10 were started weekly. All began by receiving intramuscular medication. Dosage was 100 mg. the first day, 100 mg. twice daily the second day, and 150 mg. twice daily the third and fourth days. This was followed by oral medication the fifth day at 200 mg. twice daily, with a gradual increase to a maximum of 1400 mg. in most cases by the thirtieth day. In 2 patients, because of hypotension following the initial intramuscular dose, the drug was given orally the second day. In 2 patients, intramuscular medication had to be continued after the initial period because of refusal to take the medicine orally. The maximum dosage reached was 1800 mg. daily, the

Presented at General Staff Conference, St. Elizabeths Hospital, Washington, D. C., Dec. 17, 1956.

\* The trade name of Wyeth Laboratories, Philadelphia, for promazine hydrochloride is Sparine.

highest sustained dosage being 1400 mg., the longest period at this dosage for any one patient being 82 days. The drug was given twice daily throughout the study.

In the women's service, there were one group of 8, one group of 7, and seven groups of 5 started weekly. Three groups were started the first day with 50 mg. intramuscularly, followed by 100, 150, and 300 mg. intramuscularly the second, third, and fourth days consecutively. On the fifth day 400 mg. was given orally and the dosage gradually increased over a two and a half month period to 1000 mg. daily. Four groups received 100, 200, and 300 mg., intramuscularly, on the first, second, and third days. This was followed by 600 mg. orally on the fourth day and then increased to 1000 mg. daily in less than a month. Both of these groups were eventually taken to 1600 mg. daily. One group (7 patients) received 50 mg. intravenously (a.m.) and 50 mg. intramuscularly (p.m.) on the first day, followed by 300 mg. intramuscularly on the second day and 600 mg. orally on the third day. One group (8 patients) received 150 mg. orally on the first day, 300 mg. orally on the second day, and 600 mg. orally on the third day. In the last two groups, the drug was increased rapidly to 1000 mg. a day. A few of these patients reached 1600 mg. daily. The highest sustained daily dosage in all groups was 1000 mg., the longest period at this dosage for any one patient being 57 days. After the initial period, all patients received the drug three times daily up to the dosage of 1000 mg. daily and then four times daily.

In both the men's and women's services the dosage was changed according to individual need.

Throughout the study, clinical observation was emphasized. This was true from the doctors', nurses', and attendants' points of view. A complete physical and mental evaluation was done on all patients prior to the study. White blood counts and urinalyses were done on all patients. White blood counts were repeated routinely at approximately four to six week intervals. Generally, white blood counts below 4000, or those with an increase in lymphocytes with relative decrease in polycytes, were repeated. A fatal case of agranulocytosis (previously reported)\* pointed up the importance of clinical observation and frequent white blood counts with particular attention to a decreasing white blood count. Daily temperatures were taken of all patients for three weeks without significant change. Specific evaluation of mental status was made frequently by a physician.

In addition to white blood counts and urinalyses, on the women's service, hemoglobin, hematocrit, chest roentgenogram, and serum bilirubin were checked. Because of more available personnel on the women's service, in addition to temperature, pulse and blood pressure were also taken routinely twice daily. Pulse and blood pressure changes are noted under the discussion of complications.

Because of complications, including the fatal case of agranulocytosis mentioned above, the study was terminated just short of five months. It was not felt that the degree of psychiatric improvement noted offset the seriousness of the complications.

The most serious complications were the 1 case of agranulocytosis and a series of con-

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\* WOODWARD, D. J., AND SOLOMON, J. D.: A fatal case of agranulocytosis occurring during promazine (Sparine) therapy, *J.A.M.A.* 162:1308-1309, Dec. 1, 1956.

vulsive seizures. During the course of treatment, there were 22 grand mal seizures in 19 patients and seven petit mal seizures in 7 patients. In 3 of the patients suffering a seizure, there was a history of previous convulsive disorder. One of these patients is described as having had a single seizure associated with fever in early childhood. The other 2 had single seizures occurring during their hospitalization. One of these 2 had had electroshock therapy. The remaining 23 patients who suffered a seizure did not have a history of previous convulsive disorder. In 10 of these there was no history to suggest organic brain disease. In 1 there was a history of "peculiar falling-out spells" associated with smelling gas and destructive behavior. This patient, however, had a normal electroencephalogram. In 1 patient there was a vague unconfirmed history of "epilepsy" but with no subsequent history. Nine patients had had electroshock therapy but no history of seizure prior to promazine therapy. One patient who had had electroshock therapy also had a history of alcoholism. Two patients had central nervous system syphilis.

The seizures occurred between the twelfth and the one hundred and twenty-seventh day of treatment, with dosages ranging from 600 to 1800 mg. daily. Nineteen seizures occurred at dosages above 1000 mg. daily.

In general, the dosage was reduced after a seizure. On the first man to suffer a grand mal seizure, the medication was stopped because of a history suggestive of epilepsy (but not subsequently confirmed by electroencephalogram). On another man it was continued at the same level (1400 mg.), and a second grand mal seizure occurred 12 days later, at which time the medication was discontinued. On 1 woman dosage was reduced following the first seizure, and a second seizure occurred 40 days later at the reduced dosage.

Electroencephalograms were requested in all cases of seizure. Of the men suffering a seizure, 5 out of 7 had normal electroencephalograms. Electroencephalograms on women have not been completed and so are not included in this report. Early neurological examination following seizure was done, but no significant findings were reported. In some instances a complete neurological survey was requested, but, due to the lapse of time between seizure and examination, it was not felt that findings would be positively indicative of a relationship between the seizure and the medication.

In the 71 patients who did not develop seizures while taking this drug, 23 had a history suggestive of organic brain disease. Of these, 11 had had electroshock, 1 pentamethylene-tetrazol, 4 prefrontal lobotomy, 1 a questionable history of idiopathic epilepsy in adolescence, 1 a history of two isolated convulsive seizures during hospitalization with a normal neurological survey (including normal electroencephalogram), 1 a birth injury, and 4 a history of alcoholism.

Other significant complications encountered were: 22 patients with allergic reactions (dermatitis, unusually dry skin, edema of the ankles and neck and generalized edema); 2 patients with local reactions; 6 patients with hypotension (in 3 of these this was noted only following the initial intramuscular dose); 10 patients with vertigo and weakness without blood pressure change; and 1 patient with tremor. Constipation was common but easily relieved.

During the study, 1 diabetic went out of control and even though it was not thought to

be related, promazine was discontinued. It was interesting to note that control was re-established almost immediately after the drug was stopped. One other diabetic (controlled on diet alone) was maintained in good control throughout the study. In another case, tachycardia developed during the course of study, but on complete medical examination the condition was not found to be related to the drug.

On each service there was a noticeable change in ward atmosphere. Generally the wards were much quieter, and assaultive behavior was unusual, particularly in the men's service. There were no seclusions at the beginning of the study in the men's service. In the women's service there was 1 patient in seclusion at the start of treatment, and there was little change in her behavior until late in therapy when she was able to be out of seclusion periodically. Three patients who required seclusion periodically before promazine continued to require seclusion at intervals while receiving the drug.

Individually the degree of psychiatric improvement was minimal. A few cases did show improvement in patterns of behavior, but this was felt as much attributable to extra attention as to the drug. This might also apply to the general quieting of the ward atmosphere. One patient on the men's service on the twentieth day of treatment (1000 mg. daily dosage) became more restless, hyperactive, and confused, and, in spite of increasing the drug to 1600 mg. daily, this behavior continued throughout treatment.

## SUMMARY

Administration of promazine to 97 chronic psychotic patients over a period of almost five months produced little symptomatic improvement. One death from agranulocytosis and 29 convulsive seizures in 26 patients occurred in this series. Nineteen of the 29 seizures occurred at daily dosages of 1000 mg. or more.

## RESUMEN

La administración de promazina a 97 pacientes psicóticos crónicos por un período de casi cinco meses, produjo muy pequeña mejoría sintomática. En esta serie se registraron una muerte por agranulocitosis y 29 ataques convulsivos experimentados por 26 pacientes. Diecinueve de las 29 crisis convulsivas ocurrieron con dosis diarias de 1000 mg. o más.

## RESUME

L'administration de promazine à 97 malades atteints de psychose chronique, pendant une période de presque cinq mois, n'a produit que peu d'amélioration symptomatique. Dans cette série, il y a eu un décès par agranulocytose et 29 accès convulsifs se sont produits chez 26 patients. Parmi ces 29 crises convulsives, 19 sont survenues lorsque la dose atteignait ou dépassait 1 000 milligrammes par jour.

# A Controlled Study of the Use of Meprobamate in a Mental Hygiene Clinic

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The function of meprobamate (Equanil:\* 2-methyl-2-*n*-propyl-1,3-propanediol dicarbamate) in allaying anxiety among psychiatric patients has received wide notice in the lay press as well as in psychiatric literature. The drug has attained nation-wide usage, and under its trade names has become incorporated in popular parlance. Although the amount of pharmacological investigation has been considerable, the number of controlled studies has been small.

Certain pharmacological effects have been suggested for meprobamate: (1) Muscle relaxation<sup>2, 3</sup>—the drug apparently produces a selective blocking action; (2) hypnosis<sup>7</sup>—one study suggests that meprobamate has a delayed and prolonged effect in producing sleep, similar to the effect of phenobarbital, but less marked; (3) drowsiness, an effect noted in nearly every report on this drug; (4) anticonvulsant,<sup>8</sup> used mainly in petit mal; and (5) electroencephalographic changes—Hendley et al.<sup>5, 6</sup> found marked synchronization with a slowing of frequency in the diencephalon of cats, whereas Tucker and Wilensky<sup>10</sup> found the drug frequently causes fast activity, most marked in the frontal areas of humans.

Meprobamate has been most widely used for the relief of anxiety. Ferguson and Linn<sup>4</sup> remark that, in their trial of meprobamate, 40 of 80 hospitalized patients became worse on 400 mg. given three times daily. Barsa and Kline found no clinical improvement from meprobamate in a group of 30 chronically psychotic patients. On the other hand, Tucker and Wilensky did a double blind study extending over a period of 18 weeks, consisting of a two week premedication observation period, a 12 week medication or placebo period, and a four week postmedication observation period. In their group of chronically hospitalized schizophrenics, there was a significant (chi square significant at 1 per cent level) reduction in anxiety and tension in the group of patients under medication, as contrasted with the placebo group.

## PURPOSE

Throughout the literature, the assumption is made repeatedly, and clinical data sometimes suggest, that relaxation and anxiety reduction are the purpose and consequence of administering meprobamate. Experimental studies with animals other than man, and with large dosages of the drug, have demonstrated obvious physiologic effects of this nature. However, when man is used as the subject, particularly emotionally disturbed man, and

From the Veterans Administration Mental Hygiene Clinic, St. Paul, Minn. Also contributing were Drs. Albert Fisher and D. R. Stieper of the Clinic staff, and the Outpatient Clinic Pharmacy staff.

\* The trade name of Wyeth Laboratories, Philadelphia, for meprobamate is Equanil.

dosages are low as a precaution against unknown side effects, the results of administering the ataraxic are less certain.

This study was designed as pilot research primarily to measure the effect of meprobamate upon anxiety level and secondarily to determine if clinical judgment can indicate the results of taking meprobamate. Our assumption was that consequences of using meprobamate with emotionally disturbed persons could be best demonstrated in the direction of anxiety reduction. Our hypotheses were that psychological tests, clinical judgment, and patient self-evaluations would demonstrate anxiety reduction following administration of the drug, and that the psychotherapists working with the patients taking the drug could tell whether they were on the drug.

#### PROCEDURE

All patients beginning psychotherapy at the Mental Hygiene Clinic, or at the onset of returning for therapy, constituted the population from which the sample was drawn. Psychotherapists involved were either psychiatrists or psychologists. The goal was to accumulate approximately 30 patients in each of two groups as part of a double blind study in which neither the psychotherapist nor the patient would be aware of whether the meprobamate or the placebo was being dispensed by the pharmacy.

Patients were included in the sample (1) if, in the judgment of the team (for new cases) or the psychotherapist (for returnees), they could randomly be put into a medication or placebo group without harm to their therapy or physical condition; (2) if the intake psychiatrist (for new cases) or the psychotherapist (for old cases) considered that some anxiety existed (above 0 on the anxiety scale to be discussed); and (3) if the Welsh Anxiety Index on the Minnesota Multiphasic Personality Inventory given before therapy began was 60 or above (corresponding to a minimum of "mild free floating anxiety," which excludes 10 to 15 per cent of clinic patients).

Patients were selected on this basis over a period of several months, serially as they appeared at the clinic, until 59 were accumulated, considered near minimum for statistical analysis. Of these, it turned out that 31 patients had fallen into the placebo group and 29 into the meprobamate group (by chance, determined by throw of a die). Incomplete data required that three of the meprobamate patients be dropped, which left two groups of 31 and 26 respectively.

The project was set up to last for 30 days. The dosage used was 400 mg. three times a day, which patients could adjust upward or downward. A record was kept as to the average number of pills used daily. The range was from 3 to 8. Both the dosage and length of time covered by this study are inadequate to measure the full consequences of usage of the drug, but they correspond closely to the actual clinical approach to using any new drug. The shortness of the interval was necessitated by the fact that the therapists did not want to commit themselves to using the drug experimentally for more than 30 days with patients who might be unresponsive to it, and with whom alternative forms of therapy might be considered more appropriate after a month. The dosage was the minimum considered to

be possible for effective usage and was kept near this level as a precautionary measure for a new drug being used on an outpatient basis.

The criteria used to determine what changes, if any, occurred following administration of the drug were as follows: (1) The Minnesota Multiphasic Personality Inventory (MMPI) was given by a psychologist during the intake procedure and after four weeks. In addition to the regular clinical scales, changes in the anxiety index from the initial to the final MMPI were determined. (2) The psychologist who did the intake testing predicted at the beginning and end of the one month experimental period, on the basis of the MMPI and a short interview each time, whether the patient was on the drug or the placebo. He also rated the patient's anxiety. (3) The psychotherapist predicted at the end of two weeks, and again after four weeks, whether the patient was on meprobamate or placebo. (4) The psychotherapist rated, on a six point scale, the amount of the patient's anxiety after the first interview with the patient, at the end of two weeks, and at the end of four weeks. (5) A self-evaluation questionnaire was completed by each patient at the end of two weeks and again at the end of four weeks. This questionnaire asked the patient to indicate his progress in therapy through checking on a three point scale or answering yes or no to questions covering general effect of the use of the drug, his powers of concentration, ease in living, pleasure from leisure time, sleeping, troublesome thoughts, specific nervous symptoms, and specific side effects.

The clinical procedure consisted of the psychotherapist's casually offering a prescription to the patient during the first therapy interview with the following stock instruction:

These tablets may be of some help to you. We want you to take them for 15 days at a time. We'll see you at the end of the 15 days, at which time you will return the medication bottle, so we can see how many tablets have been used. To what you have left will be added enough for another 15 days. You are at liberty to adjust your dosage upward or downward. You may call the clinic if you have a question about changing the amount you are taking. Three tablets a day and, if you wish, another at bedtime, is the usual dose. However, if you notice no effect after two or three days, feel free to increase the dose upward. This may be done without consulting us until you are taking 8 tablets a day. If you feel more are necessary, call us. We may have to give you more tablets before the 15 days are up. These tablets have no harmful effects, so do not worry about taking too heavy a dose.

The leeway that was given patients to adjust their dosage to their needs was used. Patients varied upward from the three per day that was recommended to them, with the meprobamate group averaging slightly fewer than six per day and the placebo group slightly more than six per day. The daily average dosage thus was close to 2400 mg. daily. In the placebo group, however, three fourths of the patients averaged six or more pills per day, whereas in the meprobamate group only half reached this average.

Anxiety ratings were made on the basis of the following scale:

0. Comfortable.
1. Mild anxiety: Inner feeling of dissatisfaction with no outward evidence, that is, entirely subjective symptoms.
2. Mild to moderate: Shows visible constraint, transient irritability, impatience.
3. Moderate anxiety: Tearful, shouting behavior privately but controlled in interviews. No acting out beyond this.

4. Moderate to severe: Flight from threatening situations, that is, definite avoidance; partial insomnia; gross temper outbursts; limited acting out.

5. Severe anxiety: Flight and fight both employed, acts out verbally and physically, suspiciousness, marked insomnia. Multiple autonomic signs multiply present.

6. Panic: Total insomnia, generalized blocking, regressive body gestures (catatonic), hostile "defensive attacks" (acute paranoid state), early depersonalization (prepsychotic dissolution of anxiety), autonomic signs full blown.

Statistical analysis was done through use of the T test and chi square test, as appropriate, for all data except the MMPI analysis, to which was added the F test for analysis of variance. All references to significant differences are at the 5 per cent level unless otherwise specified. All data from other raters were kept hidden from the various raters during the life of the project.

## RESULTS

*Ratings and Predictions.* The psychotherapists could not successfully predict which of their patients were on meprobamate and which were on placebo. At the end of the two week period there were 35 correct predictions out of 59 attempts, and at the end of 4 weeks 31 correct predictions out of 60. One major source of error was that too many patients were predicted to be on meprobamate (73 per cent at the end of four weeks).

Ratings of anxiety showed no significant difference between the meprobamate and placebo groups. On the MMPI anxiety index, both groups dropped slightly but there was no significant difference between them. The psychologists' predictions of who were on meprobamate, based upon a brief interview and the MMPI, were not significantly better than chance (52 per cent correct). In their ratings of anxiety, these psychologists considered that the placebo group showed significantly less anxiety than the meprobamate group, on the basis of the psychological data, and more anxiety reduction in the experimental period.

*Patients' Self-Evaluation.* There were no significant differences between those patients on meprobamate and those on placebo, as indicated in their self-evaluations in the following areas: More at ease during average day; able to derive pleasure from leisure time; sleeping better; and side effects including dizziness, stomach complaints, dopiness, weakness, faintness, and itchiness. In the first three of these areas, substantial improvement was noted by about two thirds of the patients in each group. The three major side effects, noted about equally in both groups, were dizziness, sickness in stomach, and itchiness. Approximately two thirds of each group noted some side effects. Symptoms of nervousness were the same in both groups.

Although self-evaluated effects in the following areas were not significant at the 5 per cent level, they were between the 5 and 10 per cent level and are given for suggestive purposes only: Powers of concentration were considered somewhat better in the meprobamate group, who also said that they felt more at ease when faced with problems; they also said "My thoughts are different" with somewhat greater frequency than the placebo group.

*MMPI.* On neither the initial nor the final MMPI tests were there any significant scale differences between the two groups, except for the K scale, which was almost significantly higher (5 to 6 per cent level) for the placebo group at the end of the therapy period. In

other words, in accordance with the trend among most other patients in therapy, the placebo group showed more defensiveness after one month of treatment, whereas the meprobamate group deviated from this common trend. Between the 5 and 10 per cent levels of significance, the meprobamate group became more extroverted (Si scale) and went down more than the placebo group on the hypochondriasis, depression, and schizophrenia scales.

The F test for differences in variance showed significant differences between the two groups. The meprobamate group was significantly more variable on hypochondriasis, hysteria, and paranoia, and altogether showed more variance on 11 of the 13 scales, which for over-all variance yields a significant difference.

Thus, though personality test scores averaged out close to the same, the meprobamate group did change significantly more, both up and down.

*Other Comparisons.* The therapists' predictions at four weeks were compared with their ratings of amount of anxiety reduction. The lack of significance of the difference suggests that the therapists' predictions of who was on meprobamate were not significantly related to their ratings of anxiety reduction; in other words, they based their predictions on some basis other than clinically observed anxiety reduction.

Patients predicted to be on meprobamate at two weeks were compared with patients predicted to be on meprobamate at four weeks. Patients were not significantly predicted in the same way each time. In other words, there was relatively low reliability of predictions, since knowing which way a therapist predicted at two weeks was no aid in knowing which way he would predict at four weeks.

The psychologists' ratings were compared with the psychotherapists' ratings to see if the four week predictions of the same patients by these two raters would be significantly related. They were. In other words, two independent raters, the psychologist doing the testing and the psychotherapist tended to make the same predictions of who were on meprobamate, tending to go wrong in the same ways apparently.

#### SUMMARY AND CONCLUSIONS

Although the dosage was not as great and the duration of treatment was not as long as could be the case with closer supervision of patients, in both respects the actual conditions for clinical trial of new drugs commonly used at the clinic were closely approximated. Patients were permitted to adjust the dosage upward, and did so, with some indication that placebo patients were more likely to increase the dosage than were meprobamate patients.

Anxiety reduction, although reliably rated between psychological examiners and psychotherapists, did not, as measured here, reflect usage of meprobamate. Future studies should probably concentrate either on obtaining a better measure of anxiety or on using different criteria of change.

Psychotherapists and psychological examiners were unable to predict which of their patients were on meprobamate and which were on placebo. They tended to overpredict the numbers on meprobamate. Patients tended to see themselves as improving regardless of whether they were on meprobamate or placebo.

The "side effects" from the use of the pills appeared with equal frequency in both the meprobamate and placebo groups. It seems likely that there is some tendency in all of these patients to have symptoms that may be called side effects of the drug, but that may appear as frequently with the patient on placebo as on the drug.

Although the obvious measures of anxiety, and of pathology on the personality test, showed no significant differences as a result of using the drug as compared with using the placebo, certain subtle but significant differences did appear between the two groups: (1) Defensiveness did not rise in the patients in the meprobamate group, as it did in those on the placebo, suggesting that the meprobamate group may remain somewhat more accessible to behavior change through subsequent life experiences or psychotherapy. (2) In addition, variability on the personality test scores was definitely greater in the meprobamate group. Thus, though the average test scores did not change significantly, meprobamate patients were more likely to go up or to go down on the test, that is, to show change in some direction. (3) One other, indirect, measure of the effect of meprobamate may be noted here, namely, that more patients in the placebo group increased their dosage substantially, suggesting that, though they could not verbalize any difference as compared with the meprobamate group, they acted somewhat differently.

Our final conclusion is that future studies of the effect of meprobamate on mental hygiene clinic patients should be of more complex design in the sense both of dividing patients into smaller groups on the basis of hypotheses about what kinds of patients will respond to the drug, and on the basis of more sophisticated criteria of change. Selective factors might include defensiveness, emotional lability, and rigidity, among others, and criteria might include such factors as accessibility to psychotherapy, willingness to continue trying ways of solving life problems, and objective measures of actual changes in life conditions such as in marital, occupational, or social areas.

#### ACKNOWLEDGMENT

The authors express their appreciation to Wyeth Laboratories for supplying the meprobamate and placebo used in this study, and to its representative, Mr. J. M. McCarthy.

#### RESUMEN

Se realizó un estudio doblemente ciego para determinar el efecto del meprobamato sobre el grado de ansiedad y si los resultados de la administración de esta droga pueden ser observados clínicamente. Cincuenta y siete pacientes sometidos a psicoterapia en la Mental Hygiene Clinic, St. Paul, Minn., se dividieron en dos grupos, a uno de los cuales se le dio meprobamato y al otro un placebo. A los pacientes de ambos grupos se les recomendó una dosis determinada, advirtiéndoles que podían variarla de acuerdo con sus necesidades. Al final de un período de 30 días se descubrió que los pacientes que tomaban meprobamato usaron muy pocas menos píldoras que los que tomaban placebo. Ambos grupos de pacientes mostraron la tendencia a sentirse mejorados y con análogos efectos secundarios. En el grupo tratado con meprobamato, parecieron ser menores las defensas y mayores los re-

sultados anotados en los cambios de personalidad. Las conclusiones clínicas no fueron terminantes, prevaleciendo la opinión de que un número notablemente mayor de pacientes estuvo tomando más meprobamato de lo necesario.

## RESUME

Une étude "double blind," c'est-à-dire une étude où médecin et malade ignorent l'identité du médicament, a été instituée pour mesurer l'effet du méprobamate sur le degré des phénomènes anxieux et pour déterminer si les résultats produits par son administration peuvent être discernés cliniquement. Cinquante-sept patients soumis à la psychothérapie à la *Mental Hygiene Clinic*, St. Paul, Minnesota, ont été répartis en deux groupes: l'un recevant le méprobamate, l'autre un placebo. On donnait aux malades des deux groupes les doses recommandées et on leur permettait de modifier leur propre dose selon les besoins. Au bout de 30 jours, on a observé que les malades prenant le méprobamate avalaient moins de pilules que ceux qui prenaient le placebo. Les deux groupes de malades avaient tendance à se considérer comme étant améliorés et à éprouver les réactions secondaires au même degré. Les attitudes de défense paraissaient toutefois moindres dans le groupe du méprobamate, et les scores de personnalité étaient beaucoup plus variés. Les évaluations cliniques ont échoué, car elles tendaient à faire supposer que le nombre de malades prenant le méprobamate était significativement supérieur à celui existant en fait.

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# QUARTERLY REVIEW OF PSYCHIATRY AND NEUROLOGY

✱

*Incorporating the International Record of Psychiatry and Neurology*

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INCORPORATING INTERNATIONAL RECORD



OF PSYCHIATRY AND NEUROLOGY

## FOREWORD

The purpose of the QUARTERLY REVIEW OF PSYCHIATRY AND NEUROLOGY is to present promptly brief abstracts, noncritical in character, of the more significant articles in the periodical medical literature of Europe and the Americas.

For reader reference, the abstracts are classified under the following general headings:

### PSYCHIATRY

1. Administrative Psychiatry and Legal Aspects of Psychiatry
2. Alcoholism and Drug Addiction
3. Biochemical, Endocrinologic, and Metabolic Aspects
4. Clinical Psychiatry
5. Geriatrics
6. Heredity, Eugenics, and Constitution
7. Industrial Psychiatry
8. Psychiatry of Childhood
9. Psychiatry and General Medicine
10. Psychiatric Nursing, Social Work, and Mental Hygiene
11. Psychoanalysis
12. Psychologic Methods
13. Psychopathology
14. Treatment
  - a. General Psychiatric Therapy
  - b. Drug Therapies
  - c. Psychotherapy
  - d. The "Shock" Therapies

### NEUROLOGY

1. Clinical Neurology
2. Anatomy and Physiology of the Nervous System
3. Cerebrospinal Fluid
4. Convulsive Disorders
5. Degenerative Diseases of the Nervous System
6. Diseases and Injuries of the Spinal Cord and Peripheral Nerves
7. Electroencephalography
8. Head Injuries
9. Infectious and Toxic Diseases of the Nervous System
10. Intracranial Tumors
11. Neuropathology
12. Neuroradiology
13. Syphilis of the Nervous System
14. Treatment
15. Book Reviews
16. Notes and Announcements

In fields which are developing as rapidly as are psychiatry and neurology, it is obviously impossible to abstract *all* the articles published—nor would that be desirable, since some of them are of very limited interest or ephemeral in character. The Editorial Board endeavors to select those which appear to make a substantial contribution to psychiatric and neurologic knowledge and which promise to be of some general interest to the readers of the REVIEW. Some articles, highly specialized in character, or concerning a subject already dealt with in an abstract, may be referred to by title only at the end of the respective sections.

A section entitled INTERNATIONAL RECORD OF PSYCHIATRY AND NEUROLOGY is included at the beginning of the journal. The Record Section consists of advanced clinical and experimental reports.

The Psychiatry and Neurology Newsletter was compiled by Dr. Francis N. Waldrop.

The Editorial Board at all times welcomes the suggestions and criticisms of the readers of the REVIEW.

WINFRED OVERHOLSER, M.D.  
*Editor-in-Chief*





# Psychiatry and Neurology

## NEWSLETTER

### FELLOWSHIPS AND GRANTS-IN-AID FOR PSYCHIATRIC

RESEARCH: The Foundations' Fund for Research in Psychiatry has announced that Jan. 15, 1959, will be the next deadline for receipt of completed applications for research fellowships in psychiatry, psychology, neurophysiology, sociology, or other sciences relevant to mental health. December 10, 1958, is the next deadline for applications for research grants-in-aid. Interested persons should write to Foundations' Fund for Research in Psychiatry, 251 Edwards Street, New Haven, 11, Conn.

### APA BIOGRAPHICAL DIRECTORY: A new Biographical

Directory of the American Psychiatric Association, giving professional and other biographical information on some 10,000 psychiatrists, became available in August, 1958. This directory is almost 50 per cent larger than the 1950 edition. Listings are arranged alphabetically with a geographic index. The volume also includes the history, constitution, and bylaws of the APA. The directory is available from R. R. Bowker Company, 62 West 45th Street, New York 36, N. Y., for \$25 postpaid.

### APPOINTMENT TO WHO MENTAL HEALTH PANEL: Dr. D. G.

McKerracher, professor and head of the psychiatry department, University of Saskatchewan, has been appointed to a five year term on the World Health Organization's expert advisor panel on mental health. Dr. McKerracher formerly served as director of psychiatric services of the Saskatchewan Department of Public Health.

### APPOINTMENTS FOR ILLINOIS STATE PSYCHIATRIC IN-

STITUTE: Dr. Lester H. Rudy has been appointed as superintendent of the new Illinois State Psychiatric Institute in Chicago, which is expected to be completed early in 1959. Dr. Rudy is at present superintendent of Galesburg State Research Hospital. Director of research for the new institute will be Dr. Percival Bailey, and Dr. Jules Masserman has been appointed director of education.

### NEWSLETTER FOR PSYCHIATRIC AIDES. Publication of

The Correspondent, a newsletter for psychiatric aides,

attendants, practical nurses, and technicians has been begun by the National League for Nursing, 2 Park Avenue, New York 16, N. Y. Articles relating to improvement of patient care and comments or suggestions will be welcomed.

16TH ANNUAL MEETING OF THE AMERICAN PSYCHOSOMATIC SOCIETY: This meeting is to be held May 2 and 3, 1959, at Chalfonte-Haddon Hall, Atlantic City, N. J. Titles and abstracts of papers to be considered by the program committee for presentation at the meeting should be submitted in octuplicate by December 1, 1958 to: Dr. Milton Rosenbaum, 265 Nassau Road, Roosevelt, N. Y. Time for each presentation will be limited to 20 minutes.

84TH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION: This meeting will be held in Atlantic City, N. J., at the Claridge Hotel, June 15 to 17, 1959. Dr. Charles Rupp, of Philadelphia, Pa., is Secretary of the Association.

THE SECOND INTERNATIONAL CONGRESS OF NEUROLOGICAL SURGERY: This meeting will be held in Washington, D. C., October 14 to 20, 1961. Headquarters will be at the Statler Hotel. The Executive Committee, composed of two delegates from each member society, will meet on Saturday, October 14, 1961. Registration and a reception will be on October 15, 1961, and scientific sessions will be held Monday through Friday, October 16 to 20, 1961.

THE AMERICAN ELECTROENCEPHALOGRAPHIC SOCIETY ELECTS OFFICERS: The following officers were elected at the annual meeting held in Atlantic City, N. J., on June 13, 1958. President, W. T. Liberson, M.D.; president-elect, Arthur A. Ward, M.D.; treasurer, Isadore Zfass, M.D.; secretary, Jerome K. Merlis, M.D.

THE AMERICAN NEUROLOGICAL ASSOCIATION ELECTS OFFICERS: At its 83rd annual meeting, in Atlantic City, N. J., on June 16 to 18, 1958, the following officers were elected: president, Bernard J. Alpers, Philadelphia, Pa.; president-elect, Derek Denny-Brown, Boston, Mass.; first vice-president, Paul I. Yakovlev, Boston, Mass.; second vice-president, Margaret A. Kennard, Fort Steila-coom, Wash.; secretary-treasurer, Charles Rupp, Philadelphia, Pa.; assistant secretary, William F. Caveness, New York, N. Y.; and editor of transactions, Charles Rupp, Philadelphia, Pa.





# QUARTERLY REVIEW OF PSYCHIATRY AND NEUROLOGY

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## ABSTRACTS

### psychiatry

#### ADMINISTRATIVE PSYCHIATRY AND LEGAL ASPECTS OF PSYCHIATRY

139. *Psychiatry's Contributions to Criminal Law and Procedure.* WINFRED OVERHOLSER, Washington, D. C. *Psychiatric Quart. (Suppl.)* 31 (2):207-221, 1957.

This is a review of the evolution of "tests of insanity" in criminal cases, from Bracton to the "Durham rule," with comments on the advantage of the latter. The author also discusses mental fitness for trial, credibility of witnesses, and expert testimony, including the Briggs law of Massachusetts and other proposed remedies for the "battle of the experts." He concludes that "as the public becomes better educated as to psychological mechanisms, and as psychiatry progresses, we may expect still further advances in a more humane, a more intelligent, and a more effective disposition and treatment of the offender against the law."—*Author's abstract.*

#### ALCOHOLISM AND DRUG ADDICTION

140. *The Phenomenon of Auditory Hallucinations in Chronic Alcoholism. A Critical Evaluation of the Status of Alcoholic Hallucinosi.* MAURICE VICTOR AND JUSTIN M. HOPE, Boston, Mass. *J. Nerv. & Ment. Dis.* 126:451-481, May, 1958.

The phenomenon of auditory hallucinations in chronic alcoholism is reviewed. Clinical observations of 76 instances of this illness are recorded, and illustrative case histories are presented. Although the occurrence of auditory hallucinations was the outstanding feature in all the cases, several clinical forms could be distinguished: (1) In 68 instances the hallucinations were benign and transient and were frequently associated with other signs of prolonged inebriation and abstinence; (2) in 8 patients the hallucinations persisted for several weeks or months; (3) in 4 of these the illness was indistinguishable from the first type

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at its outset, but later the characteristic symptoms of schizophrenia developed. The authors' observations indicate that a syndrome may emerge in relationship to excessive drinking that is clinically indistinguishable from schizophrenia. The patients with this syndrome could not be considered schizophrenic prior to its appearance, and the age of onset was later than that usually encountered in schizophrenia. The concept that the schizophrenic-like illness is simply "latent schizophrenia made manifest by alcohol" is neither logical nor consistent with the observed facts. The current theories concerning the etiology of auditory hallucinosis are critically evaluated. Data are presented to show that the development of auditory hallucinations depends not only on the effect of prolonged inebriation but ultimately on the effect of withdrawal of alcohol. The factor or factors responsible for prolongation of the illness and for the occasional transition to a schizophrenic-like form are unknown. 30 references. 2 figures. 20 tables.—*Author's abstract.*

141. *Alcohol, Alcoholism and Conditioning: A Review of the Literature and Some Theoretical Considerations.* CYRIL M. FRANKS, London, England. *J. Ment. Sc.* 104:14-33, Jan., 1958.

From a review of the literature the author concludes that: (1) There is at present no general agreement as to the etiology, dynamics, and treatment of alcoholism; and (2) the inadequacies of much of the existing literature are such that the findings are often difficult to interpret and the conclusions, in many instances, of highly limited value. From previous experiments, carried out in England at the Maudsley Hospital, it is suggested that the relationships between conditionability and basic personality factors may be of value in the diagnosis and treatment of alcoholism as well as in predictive and selection studies. Suggestions for program research along these lines are indicated. It should be possible to produce conditioned nausea without the use of a nausea-inducing drug, and it should be possible to use noxious unconditioned stimuli other than nausea. Whatever method is used to produce a conditioned aversion, the techniques could be made more effective by first giving the patient stimulant drugs such as amphetamine or caffeine, which have been demonstrated to be effective in increasing the ease of conditionability in all kinds of subjects. Such principles may be extended to the conditioned response treatment of all forms of addictions, of certain sexual abnormalities, and of symptoms such as tics, writer's cramp, and some compulsions and phobias. Alcohol is not a direct sexual stimulant. Like most depressants, it reduces or eliminates those conditioned responses, including those acquired responses of control and behavioral inhibition, which govern and modulate our everyday lives. This is probably the mechanism by which alcohol reduces the conditioned response pattern known as anxiety. 230 references.—*Author's abstract.*

## CLINICAL PSYCHIATRY

142. *Preventive Psychiatry—Is There Such a Thing?* G. M. CARSTAIRS, London, England. *J. Ment. Sc.* 104:63-71, Jan., 1958.

Preventive measures in medicine can be carried out at three levels. Primary prevention is possible only where the specific etiological agents responsible for a disease have been

identified and can be eradicated. Secondary prevention consists of the early recognition of disease and its treatment by effective forms of therapy. Tertiary prevention can be practiced even when the etiology of a disease is unknown and when no specific therapy exists with which to treat it; it consists of judicious management of the patient, coupled with sustained attempts at rehabilitation once the acute stage of his illness is over. Psychiatry shares with general medicine a few instances of primary prevention, e.g., of general paralysis of the insane, dementia due to pellagra, and phenylketonuric idiocy. Much progress has been made in secondary prevention since the empirical discovery of a number of biological methods of treatment, of which tranquilizing drugs are the most recent development, but it is still true that perhaps the greatest task still is that of tertiary prevention, ensuring that patients are given treatment either in the community or in institutions in such a fashion that their remaining capacities for constructive social participation will be employed again as soon as their mental state permits. The author strikes a note of caution against the premature acceptance both of unproven hypotheses about the causation of mental illness and of new therapies for which extravagant claims are made, but he concedes that in fields such as psychotherapy and child guidance, where therapeutic optimism notoriously outruns scientific validation of the procedures that have been adopted, this attitude of optimism is to be commended provided that the therapists remain willing to re-examine their premises in the light of objective evidence whenever this becomes possible. 22 references.—*Author's abstract.*

143. *A Clinical Investigation of Chronic Schizophrenia.* F. J. FISH, Edinburgh, Scotland. *J. Ment. Sc.* 104:34-54, Jan., 1958.

The findings in a series of 107 women with chronic schizophrenia with an illness of 10 or more years' duration are reported. One hundred and five cases are classified according to Kleist's scheme. Two unclassifiable cases had both had pre-frontal leucotomy and repeated electroconvulsive therapy. Illustrative case histories are given of each of the Kleistian subgroups that were found in this investigation. It is suggested that the Kleistian scheme of classification is of value in future research into the causation of schizophrenia in that it may assist in the exclusion of pathoplastic factors and allow the basic neurophysiological and psychological changes to be isolated. 11 references. 5 tables.—*Author's abstract.*

144. *Post-Operative Psychoses.* E. STENGEL, B. B. ZEITLYN, AND E. H. RAYNER, London, England. *J. Ment. Sc.* 104:389-402, April, 1958.

The term "postoperative psychosis" refers to mental illnesses that follow surgical operations. These conditions have received little attention from psychiatrists and, if they are mentioned at all, they are considered with the delirious or toxic-exhaustive states. In this investigation the problem of postoperative psychoses is re-examined with special consideration of their clinical manifestations, their incidence, the types of surgical operations involved, and other etiological factors. Eighty cases were studied from the clinical and statistical point of view. A variety of common reaction types was observed. Confusional states formed only a small group. There was no evidence for the existence of a clinical entity of mental disorder following operation. The largest single group among the reaction types was that of

affective illness. There was no indication that surgical complications or the use of anesthetics were of etiological importance. The types of postoperative mental disorders observed were similar to those occurring after childbirth. Postoperative and puerperal psychoses share the common feature of an interval between the stressful event and the onset of psychiatric symptoms. Some patients had had both postoperative and puerperal psychosis. Abdominal and especially gynecological operations were highly represented in the sample studied. A comparison of the relative frequency of such operations among control groups demonstrated that their high representation among the postoperative psychoses was matched by their high incidence among the general population. Hysterectomy was followed by psychosis comparatively more frequently than other gynecological operations. Age could be shown to be an important factor in this discrepancy. 32 references. 13 tables.—*Author's abstract*

145. *Reliability of the Methacholine (Mechoyl) Test. Variations in Results When Performed upon the Same Patient by Different Examiners.* JAMES W. MAAS, Seattle, Wash. A.M.A. Arch. Neurol. & Psychiat. 79:585-589, May, 1958.

The prognostic ratings obtained from the methacholine test have been postulated to be a function of the way in which anger is handled by the patient. (Roughly an "anger-in" patient will have a better prognosis than an "anger-out" patient.) Consequently it was felt the examiner might be an important element in the test results, i.e., an Air Force officer and physician might be more likely to obtain a favorable test result (anger-in) than a ward corpsman (anger-out). This hypothesis was checked by the test being administered to 20 patients by both a physician (officer) and a corpsman (enlisted man). Both obtained a favorable prognostic rating in 2 patients; however, 3 patients had a favorable response with the physician and not with the corpsman, whereas 3 others had a favorable response for the corpsman but not the physician. It was concluded that, if the methacholine test is to be repeated, consistent results will not be obtainable with different examiners. Furthermore, it is felt that the disparate ratings may be a function of the way in which an individual patient views an individual examiner. 12 references. 1 figure. 1 table.—*Author's abstract.*

146. *Criteria Distinguishing Parents of Schizophrenic and Normal Children. An Initial Study with the Interpersonal Diagnostic System.* HERBERT M. PERR, Queens Village, N. Y. A. M. A. Arch. Neurol. & Psychiat. 79:217-224, Feb. 1958.

This study reports the results obtained when 5 married couples, the 10 parents of schizophrenic children, were compared with a control group of 6 married couples, the 12 parents of apparently normal children. All individuals were tested by the Minnesota Multiphasic Personality Test, the Thematic Apperception Test, and a special questionnaire. The raw data from these three sources were evaluated by means of a comprehensive plan of personality inventory, the Interpersonal Diagnostic System. On the basis of 32 indices obtained for each individual, certain statistically significant differences were revealed. As a group, the parents of schizophrenic children: (1) Tended to identify more closely the 32 variables studied indicating rigidity and stereotypy of perception; (2) showed greater self-deception than the control group; (3) on a preconscious level, identified "hero" with "other" figures,

suggesting some failure of their psychological maturation in the process of differentiation or individuation; (4) consciously identified their mothers with their spouses, suggesting that there was a compulsive move to continue the original hostile mother-child relationship into the marital sphere. As a further effort to augment the implied utility of this approach, it was suggested that the numbers of subjects be enlarged and that the problem of feedback (the effect on the parents of chronically ill children) be studied in parents of children with disorders other than schizophrenia. 15 references. 2 figures. 4 tables.—*Author's abstract.*

147. *Psychiatrists' Conceptions of the Schizophrenogenic Parent.* DON D. JACKSON, J. BLOCK, J. BLOCK, AND V. PATTERSON, Palo Alto, Calif. *A. M. A. Arch. Neurol. & Psychiat.* 79:448-459, 1958.

Twenty-five psychiatrists who had special experience and interest in the psychotherapy of schizophrenics were asked to describe their conception of the typical mother and father of the schizophrenic by means of the Q-sort method. In this method, a universe of 108 questions is presented to describe all aspects of behavior. The sorter rank-orders the cards in terms of those traits most applicable and those least applicable. As a result of statistical analysis three types of mothers were described by the sorters: (1) The puritanical mother, an overly controlled, highly moral, and determined woman who brooks no interference with her concept of the world. She is relatively nonsensual and cannot tolerate ambiguity. (2) The helpless mother, a weak, anxious, and confused woman who wants to be managed but has to sabotage the very control she requires. (3) The machiavellian mother, a manipulating and guileful person who clearly uses others in an attempt to attain power. She is devious, hostile, unforgiving, and unethical. Three types of fathers were also described although the agreement among the sorters was much less than that for mothers. (0.16 as compared with 0.32): (1) The "defeated" father, an uncertain, passive, and self-abasing person who is awkward and pathetic in his attempts to relate. (2) The "autocratic" father, a driving, aloof, and impassive man who may be quite successful but is a stranger to warm relationships. (3) The "chaotic" father, an anxious person who oscillates fitfully to the external and internal forces that impinge upon him. The psychiatrists' conceptions were correlated with Q-sorts done on psychological data from 20 parents of schizophrenic children and compared with 20 matched parents of neurotic children. Two mothers, the "puritanical" and the machiavellian, correlated highly with the results of the Q-sorts that were done blind. Clinical descriptions by therapists working with schizophrenics confirm the difficulty the sorters had in describing the father. The mother is usually the more dominant figure. 10 references. 4 tables.—*Author's abstract.*

148. *Treatment of Sex Offenders in California.* PAUL KIVISTO, Atascadero, Calif. *Ment. Hyg.* 42:78-80, Jan., 1958.

One of the least discussed yet most common sexual offenders arraigned in California courts, the child molestor, is discussed. The author stresses the need for treatment instead of punishment, and emphasizes the fact that the sex crime against children has its source in insanity and not in the fumbings of the average neurotic sexual psychopath. The treatment program at Atascadero State Hospital is described and also some of the sociopersonality

forces in the individual patient. Economically, the program more than pays for itself in terms of the increased productivity of the emotionally adjusted personality.—*Author's abstract.*

149. *The Concept of Hypnosis.* THEODORE X. BARBER, Cambridge, Mass. J. Psychol. 45:115-131, 1958.

Hypnosis is not a "state of consciousness." Hypnosis is not a "thing" or an "entity." Hypnosis is not something that "makes" a person behave in unusual ways. Hypnosis is a descriptive abstraction referring to an interpersonal relationship that is characterized by a number of overlapping processes. Taking the subject as our frame of reference, these processes can be conceptualized as follows: (1) The process of becoming concerned only with the words of the hypnotist and those aspects of his self and his surroundings to which the hypnotist specifically directs his attention; (2) the process of becoming ready and willing, i. e., "set," to carry out the instructions of the hypnotist; and (3) the process of coming to believe that the hypnotist's words are true statements. When the subject is concerned only with the words of the hypnotist and when he literally believes that the hypnotist's words are true statements, he experiences many or all of the hypnotic phenomena. When he "believes" that another person's purse is his own, he responds "antisocially," i. e., he does not hesitate to "steal" the other person's purse; when he "believes" that he is insensitive to pain, he does not give the expected "pain" response to noxious stimuli; when he "believes" that he is color-blind, he responds to the Ishihara test as if he does not "perceive" color. The psychology of hypnosis is therefore one aspect of the psychology of "belief" and "perception." The subject behaves in "unusual" ways only when the interacting and overlapping processes between the subject and the hypnotist are effective in altering the subject's "perceptions" and interpretations of himself and his surroundings. 77 references.—*Author's abstract.*

150. *Compensation Factor in Low Back Injuries.* EDWARD M. KRUSEN AND D. E. FORD, Dallas, Texas. J. A. M. A. 166:1128-1133, March 8, 1958.

The report is based on a study of 509 patients treated for acute low back injuries in the Physical Medicine Department. Of these, 54 per cent were eligible for compensation and 46 per cent were not. At the time of discharge, only 55.8 per cent of the patients receiving compensation were rated as improved, as compared to 88.5 per cent of the patients not receiving compensation. More than two thirds of the patients who did not receive compensation had appeared for treatment during the first month of symptoms, whereas only about one half of the patients who received compensation had been seen at this point. Patients with compensation received a significantly greater number of treatments than did those without, although hospitalization was similar for both groups. Both groups showed a definite decrease in improvement if treatment was started after more than one month of symptoms. However, compensation patients who were treated during the first week after injury did only slightly better than noncompensation patients seen three or four months after their injury. Apparently, as a group, the patients suffering from acute back strain who receive compensation present different psychological problems from those who do not receive compensation though their injuries may be the same. The difficulty appears to lie within the basic per-

sonality structure of the individual. Prompt diagnosis and early adequate treatment are essential in handling these patients. Litigation should be avoided, if at all possible. Further investigation is greatly needed. 5 references. 5 figures. 1 table.—*Author's abstract.*

151. *Sympathy and Empathy.* CHARLES D. ARING, Cincinnati, Ohio. J.A.M.A. 167:448-452, May 24, 1958.

The person who is able to determine his emotional boundaries, that is, who knows where he leaves off and where someone else begins, and who does not indulge in another's emotional problems functions more usefully, happily, and gracefully. The act or capacity of entering into or sharing the feelings of another is known as sympathy. Empathy, on the other hand, is not only an identification of sorts but also connotes an awareness of one's separateness from the observed. One of the most difficult tasks put upon man is reflective commitment to another's problem while maintaining his own identity. The ways in which one person may react to another are infinite. Several examples of sympathetic involvement are described, none more moving than the way in which patients with certain emotional problems drag the physician along, literally immobilizing him. A subtle and significant feature of a happy medical practice is the ability to remain unencumbered by the patient's problem, and, therefore, to be free to act for his greatest good. 4 references.—*Author's abstract.*

152. *Multidisciplinary Research in Schizophrenia.* WILLIAM MALAMUD AND WINFRED OVERHOLSER, Boston, Mass., and Washington, D. C. Am. J. Psychiat. 114:865-872, April, 1958.

The authors review the impact of the concept of dynamics on the study of the nature and pathogenesis of mental disorders—the dynamics of the active participation of the noxious agents and the organism, the dynamics of time, homeostasis, and the relationships of parts within an organism. The program of research initiated by the Scottish Rite of Freemasonry, Thirty-Third Degree, Northern Masonic Jurisdiction, in 1933, and continuing to expand and develop, is presented as the first organized and concerted plan for multidisciplinary research in the field of research in schizophrenia. The authors stress the importance of communication among the various disciplines concerned.—*Author's abstract.*

153. *Personality and Creativity in Artists and Writers.* JOHN E. DREYDAHL AND RAYMOND B. CATTELL, Stillwater, Okla. J. Clin. Psychol. 14:107-111, April, 1958.

The personality characteristics of eminent artists and writers were investigated by means of the 16 personality factors test, and comparisons were made between this population and the normal or standardization population. Creative artists and writers differed from the normal population in being more intelligent, emotionally mature (ego strength), dominant, adventurous, emotionally sensitive, bohemian, radical, and self-sufficient, and of a high ergic tension level. They were also less cyclothymic, surgent, and subject to group standards and control. The experimental population was similar to a creative scientist population reported in another study in 10 of the 16 factors measured by the 16 personality factors test. These findings have implications apart from their possible specific use in the selection and

encouragement of creative persons. Therapists, as Lindner has suggested, might well be advised to discard some of the present-day emphasis upon "adjustment" and be careful to avoid helping their potentially creative patients acquire the placid but unproductive contentedness of the herd-adjusted cow. The creative individual does not seem to be the sort of person that one might describe as well adjusted in its more inclusive sense (e. g., for many, introversion counts as maladjustment); rather, he appears to possess what Matthew Arnold and other great writers have described as the "divine discontent." A further possible implication lies in the field of education itself. The results of this study would suggest that the sort of academician that the usual university administrator finds congenial and unobtrusive might not be the kind that would be of most use to the university in regard to its scholarly reputation. These implications may be misunderstood in a brief statement but will be discussed in a future article. 16 references. 3 tables.—*Author's abstract.*

## GERIATRICS

154. *Weights of Brain, Heart, Spleen, and Kidneys in Elderly, Mentally Ill Patients. Relation of Organ Weights to Sex, Age, Nutrition, and Cause of Death.* GEORGE STRASSMANN, Waltham, Mass. *Geriatrics* 13:110-115, Feb., 1958.

The weights of organs estimated at autopsy depend on many factors, especially on the amount of blood and fluids present at the time of death. Therefore, large variations of the weights are observed. In mentally sick patients, dying when more than 60 years of age, such variations were also found. Yet the average weight of brain, heart, liver, spleen, and kidneys studied in several hundreds of autopsies, in obese and emaciated men and women, showed a higher average weight of each of these organs in men than in women. Also, the maximal and minimal weights were higher in men than in women. With the exception of the heart, the average weight of all organs was lower than the normal for adults. Only the heart showed an higher average weight in both sexes, due to the frequency of hypertension and atherosclerosis. Marked atrophy of heart, spleen, liver, and kidneys was seen in emaciated patients. Even in obese elderly patients, such atrophy of spleen, liver, and kidneys was common. Decrease of blood, fluids, and tissue elements, in connection with aging, as well as changed metabolism, explains this atrophy if it was not caused by impairment of the blood supply. The weight of the brain frequently did not correspond to the general nutrition of the body. Obese patients had atrophic brains, and emaciated patients sometimes showed an increase of the weight in connection with cerebral hemorrhages, hydrocephalus, brain tumors, meningitis, or swelling of the brain due to uremia. 3 figures. 3 tables.—*Author's abstract.*

155. *The Care and Treatment of the Elderly Chronically Ill Neuropsychiatric Patient in the Veterans Administration.* J. F. CASEY, Washington, D. C. *South. M. J.*, 51:31-34, Jan., 1958.

The problem of the elderly, chronically ill psychiatric and neurologic patient is becoming a major one throughout the nation. The Veterans Administration has attacked it by transferring 1621 such patients from crowded psychiatric hospitals to available beds in 20 general

medical and surgical hospitals. Care was taken to transfer only those patients who primarily needed medical and nursing care, and who had already had or did not need definitive psychiatric treatment. This resulted in better physical care for these patients and released their beds for other mental patients with better psychiatric prognosis, giving them the therapeutic advantages found in a psychiatric hospital, including the various paramedical services: physical medicine and rehabilitation, occupational therapy, manual arts therapy, activity therapy, and so on. The procedure has proved to be quite successful; only the exceptional case has had to be returned to the psychiatric hospital.—*Author's abstract.*

## HEREDITY, EUGENICS, AND CONSTITUTION

156. *The Role of Genetics in Psychiatry.* JOHN D. RAINER AND FRANZ J. KALLMANN, New York, N. Y. *J. Nerv. & Ment. Dis.* 126:403-414, May, 1958.

It is important to re-evaluate the role and significance of genetics in modern psychiatry, since the science of genetics has itself been greatly broadened in scope in recent years. As a basic biological science, genetics is not limited in its influence to any particular level of psychiatric research. It can be of value to all psychiatrists, whatever their primary influence and approach.

The refined methods of population genetics are useful and necessary in any demographic study, especially since modern theories of genic action open variations in normal and disordered behavior patterns to genetic investigation. In the field of psychodynamics, marked advantages and potentialities fall within the reach of workers who combine the methods of psychoanalytic and genetic disciplines. Such an integrated approach, implicit in classical psychoanalytic theory, affords an opportunity to recognize fundamental genetic differences among individuals and correlate them with prenatal and postnatal developmental interaction. Neurophysiological and neurochemical research activities have been much encouraged by the results of comparative genetic family studies in the major psychoses. These in turn are supported by work at the basic level of cellular activity in which the enzymologist, the cytologist, the physical chemist, and physicist have joined the experimental geneticist in their search for basic explanations. Of serious concern from the eugenic standpoint is the genetic effect of ionizing radiation. Clinically an understanding of basic genetics is a prerequisite for the psychiatrist in caring intelligently for his patients and their families. 64 references.—*Author's abstract.*

## PSYCHIATRY OF CHILDHOOD

157. *Some Psychiatric Problems Related to Mental Retardation.* LORNA M. FORBES, Los Angeles, Calif. *Am. J. Ment. Deficiency*, 62:637-641, Jan., 1958.

Psychosexual development is markedly affected by parental attitudes, but the reverse is also true. In the case of mental defectives, delay in this development has a marked effect on the parents leading to maternal overprotection, followed by maternal control, often submissive to the child's instinctual demands. Attention is called to the excessive body and social contacts, infantilization, and prevention of independent behavior described by Levy as largely the result of the mother's needs. With mental defectives the extreme dependence

fosters overprotection, which, if submissive, leads to behavior patterns characteristic of the anal stage in the extreme. The mother, in a dilemma, is then unable to set more clearly defined limits and can think only of separation of the child from the family. Forgotten is the dependency that has fostered her overprotection. If mental deficiency is considered as a condition from birth or early infancy, requiring supervision and treatment for a child's welfare or the welfare of others, it must be accepted that the retarded child is always dependent and never achieves emotional maturity. At the same time, placement is not directly related to this fact but to problems inherent in the family constellation. It is noted that mothers who assert a dominant type of control tend to keep defectives at home through adult life. To keep more of these children in the home and community, treatment must be aimed toward helping the parents deal with the dependency. Some physicians, with Mongoloids, advise placement at birth; in practice, however, the author has found most mothers to be more seriously disturbed as a result. To the author, however, there seems little question that treatment must involve the professional skills of the psychiatrist and his ancillary services in dealing with the dependency as well as with the parental guilt and anxiety. The great hurdle is parental resistance to psychiatric referral. Psychiatric referral would, of necessity, have to be offered in such a way that the parents would not feel their guilt and anxiety to be re-inforced but would understand it as a means of help in handling this particularly different relationship. 6 references.—*Author's abstract.*

## PSYCHIATRY AND GENERAL MEDICINE

158. *The Relation of Student Anxiety to Concepts of Role in Medical Care.* F. D. MC CANDLESS AND MORRIS WEINSTEIN, Albany, N. Y. *J. Med. Educ.* 33:114-151, Feb., 1958.

In providing long-term medical care for a family, students were expected by their patients to deal with many emotional and social problems. The anxiety thus precipitated influenced the student's concept of his role as physician according to his method of resolving it. When a student's preconception of a physician's role excluded attention to the patients' emotional and social problems, anxiety and frustration resulted. When anxiety was shared in small group conferences with peers and staff as a corrective emotional experience, it was reduced and broader concepts of role could be explored. Students tended to fall into one of the following groups according to the predominant technique of resolving anxiety and frustration: (1) Rejecting the issue with which the patient is struggling as having no importance in medical care or as outside the physician's responsibility. (Here treatment goals were constricted to the care of somatic disease, and anxiety in the doctor-patient relationship remained high.) (2) Simple acceptance of emotional, social, and environmental problems as an unavoidable reality of medical practice but with displacement of responsibility to modify these issues onto the patient. (This group tended to be relieved of anxiety when the source of anxiety in the patient was defined.) (3) Incorporation of the problem as an issue of significant responsibility in patient care. (Among these students anxiety decreased. Active participation in the solution of problems and a comprehensive approach was implied.) Student-oriented conferences combined with sustained responsibility for a family provided a setting in which psychodynamic concepts could be integrated into the whole spectrum of medical care. Consideration of the expanding conception of the physician's role made

possible new solutions to both students' and patients' anxieties. 5 references. 3 figures.—*Author's abstract.*

159. *Freshman Research Seminar: An Experiment in Elective Psychiatry.* SPENCER BAYLES AND S. GOLDSTONE, Houston, Texas. *J. Med. Educ.* 33:363-369, April, 1958.

It is generally agreed that there is an increased need to attract good students into psychiatry and create more interest in research in the science of behavior. The present paper describes one attempt to deal with this problem. In the fall of 1955, the weekly lectures in psychiatry for freshmen opened with a survey of current theory and research in the fields of perception, learning, motivation, and their relevance to medicine. Following the sixth lecture, a group of 13 from the class of 86 students spontaneously asked for additional non-credit work in psychiatry during their "elective" hours. A two hour weekly research seminar was established to implement this elective. Each student was assigned a carefully selected faculty member as preceptor. Weekly conferences with the preceptor permitted the development of an area of study leading to a library or laboratory research project. Despite the heavy work load, all students completed their projects, which included a study of the relationship between anxiety and pregnancy complications, the effect of a sedative and a stimulant upon a test of the time sense, and the effect of mescaline on intellectual functioning and esthetic judgment. Each student presented his project in the seminar for general discussion by the other students and faculty. Weekly seminars throughout the semester permitted projects to be reported in the several stages of conception, planning, summarizing, evaluation, and final presentation. This experiment is now in its second year with an enrollment comparable to that of the first and activities associated with basic research in the science of behavior. These freshmen seminars are followed up with summer research clerkships and continued contact in succeeding years in order to maintain the students' interest and increase their knowledge and skills relevant to the basic aspects of psychiatry. An elective seminar in research and theory basic to psychiatry, organized along lines established in centers for graduate study, appears to be a teaching device of some promise to channel, stimulate, intensify, and elevate the genuine interest in behavior already present in first year students in medicine. An early start such as this may encourage the development of investigators in the mental disciplines. 2 references. 2 tables.—*Author's abstract.*

160. *The Teaching of Psychiatry to Interns.* ROBERT S. DANIELS AND E. BRUNO MAGLIOCCO, Chicago, Ill. *J. Med. Educ.* 33:451-457, May, 1958.

This report evaluated an intern teaching program in psychiatry in a university general hospital. The emphasis was on meeting the individual needs of the intern in terms of his interests, career plans, and personality. Two interns each month spent one month each in the psychiatric service of the Cincinnati General Hospital. The teaching program consisted of a minimum of 19 hours weekly, including 8 hours of individual and 11 hours of group sessions. The individual sessions included individual case supervision, interns' ward rounds, instruction in interviewing technique, and the understanding and application of dynamic theory. Others included conferences on social service, psychology, and occupational therapy; an inspection of a long-term state psychiatric hospital; a visit to the Probate Court; and

informal evening sessions. Group sessions with psychiatric residents concerned daily rounds, clinical director's rounds, case presentations, therapeutic planning, and ward management. Evaluation was made informally at the end of each intern's month's service and anonymously at the termination of the internship. During the early part of the internship year, both individual and group sessions were thought to be productive. The group sessions became less productive as the resident group matured, with the exception of those sessions where there was a practical approach to everyday clinical problems. The individual meetings were regarded with enthusiasm. This was particularly true of the interviewing sessions where tape-recorded materials were utilized. The results of the program raised serious questions about the usual practice of including the intern incidentally in sessions primarily for residents or medical students. It would be desirable to include outpatients in the program to provide the intern with experiences similar to those ordinarily encountered in practice and to provide more integration between departments. Teaching of interns is a gratifying experience for the beginner in academic pursuits, although the lack of opportunity for seeing the results of one's work may sometimes be discouraging. The repetitious quality of the material offered monthly may make a yearly change in instructors worth while. 6 references. 1 table.—*Author's abstract.*

## PSYCHOANALYSIS

161. *A Psychoanalytic Approach to Schizophrenic Anxiety.* HYMAN S. BARAHAL, West Brentwood, N. Y. *Psychiatric Quart.* 32:85-93, Jan., 1958.

The author takes issue with Federn and Fromm-Reichmann, who claim that, with neurosis, the psychoanalyst endeavors to make unconscious repressed material conscious, but that the reverse situation applies in schizophrenia. The thesis is presented that the schizophrenic is not aware of his unconscious drives and is, in fact, struggling desperately against such awareness, that schizophrenia is not a disease entity but a group of defensive maneuvers or reactions aimed at controlling anxiety. From this viewpoint, schizophrenia differs from psychoneurosis only in the degree and intensity of the anxiety-avoiding maneuver and not in kind. Schizophrenic symptoms are only a façade covering up the most intense anxiety and suffering imaginable, together with the firm conviction of being hated and abandoned. The best work with schizophrenic patients is done with a minimum of anxiety. The schizophrenic patients' problems are primarily preoedipal, and it is therefore necessary for the therapist to be the ever-loving, ever-giving, and ever-dependable parent. 8 references.—*Author's abstract.*

162. *The Impact of Psychoanalysis upon Child Psychology.* SYBILLE ESCALONA, New York, N. Y. *J. Nerv. & Ment. Dis.* 126:429-440, May, 1958.

The gradual convergence between psychoanalysis on the one hand and academic child psychology on the other is briefly discussed in the context of historic changes in the wake of evolutionary theory. Efforts to either verify or nullify basic postulates of psychoanalysis, and particularly the theory of psychosexual development, have failed largely because the relevant psychoanalytic postulates are expressed in terms of such generality as to preclude

crucial empiric tests. The major portion of the article is devoted to a discussion of more recent developments in psychoanalytic theory that emphasize manifestations of ego functioning. If behavioral research can treat ongoing behavior sequences not only in terms of psychological content but also in terms of formal characteristics, ego psychoanalytic formulations may prove susceptible to scientific verification. 8 references.—*Author's abstract.*

## PSYCHOPATHOLOGY

163. *Intrafamilial Environment of the Schizophrenic Patient: VI. The Transmission of Irrationality.* THEODORE LIDZ, A. CORNELISON, D. TERRY, AND S. FLECK, New Haven, Conn. *A. M. A. Arch. Neurol. & Psychiat.* 79:305-316, March, 1958.

A theory of schizophrenia must explain not only the patient's need to abandon reality testing, but his ability to do so. Since man probably is not naturally endowed with a logic of causal relationships, the surroundings in which he is raised must influence his ways of perceiving, thinking, and communicating. The most important of these influences is the family. It is hypothesized that the schizophrenic patient's ability to abandon reality testing derives from chronic exposure to irrational family communications that distort and deny the obvious interpretation of the environment, including affective behavior of family members. The paper is based on data from the families of 15 schizophrenic patients who have been studied by means of intensive interviewing, projective testing, and family documents. Although none of the parents of the 15 patients had ever been hospitalized, 9 patients had at least one parent who could be called schizophrenic, ambulatory schizophrenic, or clearly paranoid. Brief examples of distorted behavior and irrational attitudes in each of the nine families are presented. There are two important consequences for the child when a parent's behavior and attitudes are dominated by rigid defensive needs essential to his personal equilibrium: (1) The parent is often impervious to the child's emotional needs. (2) Communication in the family is disrupted by masking, or concealing disturbing family situations and behavior as if they did not exist. Although some degree of masking may exist in all families, in some of these families it dominated the entire family interaction. 14 references.—*Author's abstract.*

## TREATMENT

### a. General Psychiatric Therapy

164. *Milieu and Activity Therapy with Chronically Disturbed Female Patients.* JAMES F. SUESS, Warren, Pa. *Psychiatric Quart.* 32:1-12, Jan., 1958.

A method of milieu therapy and vigorous physical activity was used with a group of 78 chronically disturbed woman patients, hospitalized up to 37 years, who had been unresponsive to other therapies (electroshock therapy, insulin, ataraxics, psychosurgery, and group and occupational therapy). These women were the most disturbed and regressed patients: many of them had been involved in dozens of aggressive incidents, had received over 100 electroshock treatments without clinical improvement, and had required frequent or constant seclusion room care. The therapeutic setting was the hospital gravel bank where these

patients daily engaged in vigorous physical activity with shovel, pick, and wheelbarrows. The maximum number of patients involved at any time was 36, and as a patient showed significant improvement she was replaced by another. Of the women who improved sufficiently to leave the group, the average time spent on the project was 7 months (range, 1 to 16 months). Six of the trained personnel were used with this group at all times, 3 men and 3 women attendants (two of whom were husband and wife), making a maximum patient to personnel ratio of 6:1. It was felt that the daily presence of mother and father figures would encourage the feeling of an integrated healthy family constellation. Not all of the time was spent in mere industrial labor. Considerable time was utilized for group social and recreational experiences: picnics, athletics, card games, and so on. Clinically, there has been obvious improvement: 14 per cent of the women returned home; 13 per cent live in less supervised or open hospital areas; another 45 per cent can comfortably engage in common social activities; 97 per cent show decreased destructiveness or negativism. The opportunity for adequate interpersonal relationships is again demonstrated as being of vital importance in the treatment of mental disorder. 3 references. 4 tables.—*Author's abstract.*

## b. Drug Therapies

165. *Comparative Study of Chlorpromazine and Insulin Coma in Therapy of Psychosis.* MAX FINK, ROBERT SHAW, GEORGE E. GROSS, AND FREDERICK S. COLEMAN, Glen Oaks, N. Y. *J. A. M. A.* 166:1846-1850, April 12, 1958.

The effectiveness of chlorpromazine was compared with that of insulin coma in 60 patients referred for insulin coma therapy. One-half the group, selected on a random basis, received chlorpromazine by mouth for at least three months in doses adjusted so as to fall just short of toxicity in the individual patient; this dosage varied from 300 mg. to 2000 mg. daily, with a median of 800 mg. The insulin coma was induced by a standard technique 50 times in each patient. Chlorpromazine was found to be as effective in modifying psychotic behavior as insulin coma therapy. There was no difference in the improvement rating on discharge, incidence of complications, or effects on the psychotherapeutic relationship for either therapy. In comparison to insulin coma, chlorpromazine is safer, easier to administer, and lends itself to long-term management. Patients receiving chlorpromazine therapy are more comfortable than those receiving insulin coma. No evidence has been adduced that either therapy has altered the basic schizophrenic process, nor is there any evidence that there is greater specificity of either form of therapy for schizophrenic illnesses. 7 references. 4 tables.—*Author's abstract.*

166. *Use of Sustained-Release Chlorpromazine in the Management of Hospitalized Chronic Psychotic Patients.* JOHN VASCONCELLOS AND ALBERT A. KURLAND, Baltimore, Md. *Dis. Nerv. System* 19:173-177, April, 1958.

The paper is a clinical evaluation of results of sustained release chlorpromazine in a series of 36 chronic psychotic hospitalized patients. It was felt that the usual three and four times a day schedules of administering medication had many inconveniences, were time-consuming, and interfered with patients' activities. On the other hand, these schedules represented also

a certain advantage in terms of contacts with patients. In understaffed hospitals for the psychotic, the administering of medications is one of the few occasions on which a patient has the chance to come in contact with other people. Each patient was treated for a period of three months and evaluated psychiatrically and neurologically. The patients were started on a multidosage type of medication and then changed to a similar dosage of sustained-release type. The sustained-release capsules were given at one time in the morning even if the dosage was as high as 1200 mg. After a period of several weeks, it was felt that those patients who had been well stabilized on the medication could be maintained as well on the sustained-release form with approximately one half the amount of the original dosage. Patients and hospital personnel reacted in a very positive way toward the new method, and the original concern regarding the decrease in personal contacts with patients was not substantiated. In the final evaluation, 66.6 per cent of the patients showed various degrees of improvement. This was felt to be due to the regular administration of the drug and the avoidance of peak concentrations, since the drug is assimilated continuously over a period of 12 hours. Side reactions were considerably decreased, including those in inpatients who had previously shown neurological syndromes with much smaller dosages of regular chlorpromazine. One patient who was normally hypotensive developed a severe hypotensive reaction, demonstrating a potential hazard of the sustained-release form on this type of patient: Once the medication is given, one has to wait until it has cleared through the intestinal tract in order to bring the patient out of any complication. It was concluded on the basis of this clinical evaluation that the sustained-release type of chlorpromazine could replace the multidosage medication with great advantages. Several illustrative cases were given, and the background of sustained-release medications was briefly discussed. 5 references. 1 table.—*Author's abstract.*

167. *Chemotherapeutic Trials in Psychosis. II. Design and Conduct of a Trial of Rauwolfia Versus Reserpine and Phenobarbital in Chronic Schizophrenia.* WILLIAM J. TURNER, A. CARL, S. MERLIS, AND F. WILCOXON, Central Islip, N. Y. A. M. A. Arch. Neurol. & Psychiat. 79:597-602, May, 1958.

The early hope that rauwolfia alkaloids would prove of great benefit in treatment of chronic schizophrenia does not seem to be justified, according to several recent reports. At the Central Islip State Hospital in New York, 300 patients were followed for a four-month period. Psychologists from Adelphi College were trained in the use of the Lorr Rating Scale. The patients were divided into sets of 10. Of each set, 4 received reserpine at a daily dosage level of 0.45, 1.35, 4.1, and 12.3 mg; 4 others received the same dosage range of 11-desmethoxyreserpine (Raunormin); and 2 received 0.3 Gm. of phenobarbital. Psychological ratings by the psychologists began before treatment, and was correlated at the end of 2 and of 4 months with the qualitative observations of the attending staff. Analysis of the data was conducted by the statisticians at the Lederle Laboratories. At the higher dosage levels of reserpine, significant effects were found in improvement in behavior and decrease in conceptual disorganization. Similar effects were found with both high and low doses of 11-desmethoxyreserpine. However, the status of the patients was not significantly altered. The authors point out that in this work no special psychotherapy was provided and that

the data deal only with the effect of the alkaloids per se. 14 references. 2 tables.—*Author's abstract.*

168. *Possible Habituating Properties of Meprobamate. Clinical Study in an Institutionalized, Highly Susceptible Population.* AUSTIN R. STOUGH, McAlester, Okla. J. A. M. A. 166:882-888, Feb. 22, 1958.

Meprobamate was studied in two programs comprising 60 subjects, mostly long-term convicts whose instability might have rendered them especially susceptible to drug habituation. Most had a history of injury, disease, or psychological abnormality, including alcoholism or narcotic addiction. Many complained of headache, backache; pelvic, epigastric, or joint pain (largely psychosomatic); insomnia, nervousness, irritability, and urinary frequency. In the first program, meprobamate was administered in dosages up to 6.4 Gm. daily for four weeks, then was abruptly withdrawn and followed by a placebo period. In the second program, daily dosages up to 2.4 Gm. were given for five weeks and then gradually withdrawn in the sixth. Electroencephalograms, temperature, blood pressure, pulse and respiration rates, and complete blood counts were taken before, during, and at the conclusion of each program, and; for some patients, afterward. The medication produced sound sleep, and greater calmness and tractability; all previous discomforts subsided. No significant change occurred in hemogram or vital signs throughout the study. After both programs, all subjects had returned to pretreatment status within 48 hours, without evidence of habituation. After abrupt withdrawal in the first program, previous symptoms recurred suddenly in 24 to 36 hours and seemed related to abnormalities in history and electroencephalogram. During medication in both programs, the electroencephalograms showed fast activity and small sharp spike discharges, which regressed in 24 hours after cessation of medication except for 6 patients all of whose electroencephalogram tracings, including those before and after treatment were abnormal (2 of these had seizures within 48 hours after abrupt withdrawal in the first program). After the second program, transition to pretreatment status was gradual; 3 of the 6 with persistent electroencephalogram deviations in the first program continued to show similar variations after the second program, but none had seizures. The pretreatment electroencephalograms alone will not predict the possibility of undesirable reactions. Any ataraxic should be withdrawn gradually. 10 references. 4 figures.—*Author's abstract.*

169. *Studies with Ceruloplasmin and a New Hallucinogen.* ADRIAN M. OSTFELD, L. G. ABOOD, AND D. A. MARCUS, Chicago, Ill. A. M. A. Arch. Neurol. & Psychiat. 79:317-321, March, 1958.

A new hallucinogen, N-ethyl-3-piperidyl benzilate was administered orally in doses of 10 or 15 mg. to a group of convalescent patients and hospital employees. The agent predictably induced atropine-like effects on the peripheral autonomic nervous system. Among such effects were: decreased salivation, mydriasis, tachycardia, and facial flush. Visual and auditory hallucinations, illusions, anxiety, somnolence, and decreased recent memory were also predictable in their occurrence. The frequency with which auditory hallucinations and anxiety were reported appears to distinguish the psychological effects of this drug from

those of lysergic acid diethylamide. Serum ceruloplasmin, as measured by the P-phenyl-ethylenediamine method, was found to exhibit marked variations in subjects from one hour to the next. Intravenous infusions of epinephrine, norepinephrine, isoproterenol, and serotonin affected serum ceruloplasmin no more than infusions of 5 per cent dextrose in water. It appears that the feeling-state of anxiety is more likely to be associated with a higher serum ceruloplasmin in a given patient than is a feeling-state of tranquility. 10 references. 3 tables.—*Author's abstract.*

170. *The Adjunctive Use of Iproniazid in Psychotherapy.* FRANK ORLAND AND NATHAN L. COMER, Philadelphia, Pa. *Dis. Nerv. System* 19:182-185, April, 1958.

Ten patients, with depressive and regressive symptomatology who had been ill for a year or more, and who showed no response to psychotherapy, electroshock therapy, insulin, or psychopharmaceuticals, were given iproniazid on prescription as an adjunct to the psychotherapy. Dosages began at 150 mg./day and were rapidly reduced as effective clinical response developed. Patients responded in 1 to 6 weeks, manifesting improvement in general social and economic functioning; increased ability to verbalize thoughts and feelings and to enjoy life; decrease in pathological personality traits, fears and anxieties, and extreme dependence on others; and rapid insight into and reappraisal of past behavior patterns. Specific structural aspects of the personality underwent modification. The ego threw off its psychic fixation on depressive and regressive symptomatology, took on important observing and participating functions, and showed an increased tolerance of hostile impulses without being inundated and overwhelmed. Superego changes were evidenced by the lifting of depressed states, a decrease in inadequacy feelings and self-criticism, and increased ability to enjoy. Iproniazid appears to hasten the initiation of psychotherapy in patients with depressed and regressed symptomatology, and it is a useful adjunct to psychotherapy where such symptomatology impedes the formation of a therapeutic relationship and has not responded to psychotherapy alone or to the somatic therapies. 10 references.—*Author's abstract.*

171. *Chemotherapy of Depression. Use of Meprobamate Combined with Benactyzine (2-Diethylaminoethyl Benzilate) Hydrochloride.* LEO ALEXANDER, Boston, Mass. *J. A. M. A.* 166:1019-1023, March 1, 1958.

Depression, defined as a state of sadness, with self-reproach, psychomotor inhibition, sleep disturbance, and impaired appetite, was treated in 35 consecutive patients by the simultaneous use of meprobamate and benactyzine hydrochloride. The meprobamate was given initially in doses of 400 mg. four times daily and, when necessary, gradually increased to 1200 mg. four times daily; its purpose was to relax and reduce excitability without exerting a significant inhibitory effect. The benactyzine was given initially in doses of 1 mg. four times daily and, when necessary, gradually increased to 3 mg. four times daily; it is a mild antidepressant particularly effective in relieving the ruminative obsessive aspects of the depressive mood. Close supervision extending over the entire 24 hour span of each day had to be assured because of the risk of suicide. The usual supportive psychotherapy was given concurrently. Three case histories illustrate the procedure. The average duration of treat-

ment was eight weeks, and 20 patients (57 per cent) made a complete and/or social recovery. This is higher than the rate of spontaneous recovery under comparable conditions. It is not as high as the rate of recoveries obtained by electroshock therapy. The treatment is therefore recommended as an initial step in the treatment of depressions, designed to reduce the number of patients requiring electroshock therapy. 16 references.—*Author's abstract.*

172. *Chlorpromazine Jaundice: The Effect of Continued Chlorpromazine Ingestion in the Presence of Chlorpromazine Jaundice.* EDWARD M. SCHNEIDER, CHARLES DAUGHERTY, AND JAMES K. DEVORE, McDowell, Ky. *South. M. J.* 51:287-291, March, 1958.

Four patients who developed jaundice while receiving chlorpromazine were studied throughout the course of jaundice; administration of the offending agent was continued in unchanged dosage. In all 4 patients, a group of laboratory tests including liver function studies were done on at least three occasions during the periods of observation. In 3 of the 4, a liver biopsy specimen was obtained at the time of onset of icterus and again after all clinical and laboratory evidence of jaundice had cleared. Elevation of serum bilirubin and alkaline phosphatase was noted in every patient at the time of onset of clinical jaundice. In all patients, the initial lipid phosphorus was greater than the final determination at completion of the study. The total cholesterol levels paralleled these findings in every patient. In 2, the first liver biopsy revealed periportal infiltration and bile canaliculi plugging. The biopsy on the third patient demonstrated only slight vacuolar fatty change. Repeat biopsies (63 to 78 days later) on all 3 patients were normal except for persistent slight fatty change in 1. In 3 of the 4 patients, all evidence of jaundice disappeared within 10 to 21 days. In the fourth, normal serum bilirubin levels were not obtained until 78 days after onset of jaundice. The complete return to normal of hepatic function and morphology while chlorpromazine administration was continued effectively dispels the notion that this drug is a specific hepatotoxin. 10 references. 3 figures. 2 tables.—*Author's abstract.*

### c. Psychotherapy

173. *Some Principles in the Psychotherapy of Patients Following Hospitalization for Schizophrenia.* THOMAS N. DAVIS, III, Chicago, Ill. *Psychiatric Quart.* 32:110-118, Jan., 1958.

Patients who make a "social recovery" from schizophrenia frequently continue to have difficulty and may relapse. Yet, where conditions are suitable, a great deal more can be done for schizophrenic patients than merely to alleviate the acute symptoms with specific treatment procedures and to provide protective custodial care. Two important factors in providing adequate conditions for therapy are the patient's relationships with his family and with the psychiatrist. Work with the family may be necessary in some cases to achieve an adequate environment. Often the patient's wish for treatment is suppressed by the fear of being sent back to the hospital. However, a satisfactory experience with the psychiatrist may help overcome this fear and motivate him for therapy or encourage him to seek it later. Four cases are presented of patients with diagnosis of schizophrenia who responded to psychotherapy successfully on an outpatient basis. These patients had previously required repeated hospitalization and treatment. On an outpatient basis, each was seen weekly for

intensive psychotherapy. The minimum length of treatment was 14 months. Factors contributing to the success of therapy with these patients are discussed. Most important among these were motivation and interpersonal environment. Other important factors included emotional support, the psychiatrist's feeling of security, and the avoidance of too rapid an uncovering of threatening feelings. Interpretations that exposed overwhelming, threatening feelings or injured self-esteem were harmful. Interpretations about resistance and progress in therapy, residual childhood expectations, and self-defeating tendencies were often valuable and necessary. Comments, made when appropriate, that enhanced the patient's self-esteem were beneficial.—*Author's abstract.*

## neurology

### CLINICAL NEUROLOGY

174. *An Evaluation of Thymectomy in Myasthenia Gravis.* JOHN A. SIMPSON, London, England. *Brain* 81:112-144, March, 1958.

A long-term follow-up survey of 404 myasthenia gravis patients is reported. Of the 357 without thymic tumor, 258 were treated by thymectomy and 99 by medical means alone. These groups are shown to be comparable for statistical analysis. It is concluded that significantly fewer women die of myasthenia gravis if the thymus is removed than would be expected if they were treated with neostigmine only, and the number of women very greatly improved after 10 or more years is significantly greater. The favorable trend is also seen in men but is less marked. It is suggested that women have a poorer prognosis than men if not operated on but a better one after thymectomy, the extent of this change explaining the more obvious advantage of thymectomy in women. The improvement is most likely and the saving in life greatest when thymectomy is done within five years of the onset of myasthenia and when no thymoma is present. Though improvement may still occur after seven years the natural history of the unoperated disease is less severe thereafter and the gain from operation is not significant. The maximum improvement occurs in patients who first show symptoms and are operated on at a younger than average (27 years) age, but the difference is insufficient to influence the selection of cases for operation. No clinical indication of the type of case likely to be helped by thymectomy is noted. Clinical severity is not a helpful criterion. Thymoma (present in 47 patients, removed in 36) indicates a poor prognosis for survival, though preoperative radiotherapy may reduce the risk. Only 1 patient in 3 survives, but the improvement in myasthenia may then be as great as in non-tumor cases. The literature is reviewed, and it is suggested that apparently conflicting views are due to: (1) Nonexclusion of thymomas; (2) differing criteria for classification; (3) methods of selection for operation; (4) selection of unoperated cases for "controls." With suitable comparison all series are shown to indicate similar trends. 27 references. 2 figures. 25 tables.—*Author's abstract.*

175. *Bilateral Trigeminal Neuralgia*. LEONARD T. FURLOW, St. Louis, Mo. J. Neurosurg. 15:299-307, May, 1958.

Except for a report by Stookey in 1955, the literature contains very few detailed references to the treatment of bilateral trigeminal neuralgia. The occurrence of 9 cases of bilateral trigeminal neuralgia in a series of 127 patients operated upon in a 10 year period is a higher incidence than most reports would indicate. Of these 9 patients, 8 were operated on on both sides. In spite of sensory loss, the 6 patients who had the standard posterior root section had better results than the 2 on whom other procedures were used. In these 2 patients, a decompression of the root was done on the second side in 1 and a trigeminal tractotomy on the second side in the other. Both have subsequently had a recurrence of pain. If patients are properly selected, and if only patients with true trigeminal neuralgia who are having severe pain are subjected to surgery, the results of standard and accepted surgical treatment in this disease are excellent. 18 references. 3 tables.—*Author's abstract*.

176. *Occurrence of Neurologic Abnormalities in Infants and Diabetic Mothers*. ANATOLE S. DEKABAN AND K. R. MAGEE, Bethesda, Md. Neurology 8:193-200, March, 1958.

There is satisfactory evidence that the incidence of fetal death in diabetic mothers is very high. Similarly, the rate of congenital malformations, as estimated from autopsy findings, is greater than that in the normal population. It is suggested that the incidence of morbidity due to involvement of the central nervous system in the surviving offspring of diabetics is also higher than that in children born to nondiabetic mothers. The chief clinical abnormality in all 4 surviving infants described in this paper was severe mental deficiency. Cerebral diplegia was also present in 2. The fifth patient had pronounced malformation of many organs, particularly of the brain, that was incompatible with life. The nature of the cerebral abnormalities found in infants without prenatal malformation needs further investigation. 25 references. 9 figures.—*Author's abstract*.

177. *Hemiplegic Migraine*. R. T. ROSS, Winnipeg, Manitoba, Canada. Canad. M. A. J. 78:10-16, Jan. 1, 1958.

The subject of migraine is reviewed in general, particularly that type of migraine in which some type of sensory or motor disturbance occurs on one side of the body. Six clinical histories are presented in detail, in which patients with more conventional forms of migraine, consisting of headache and scotoma, are also described as having episodes in which they become hemiparetic and hemiparesthetic. The possible locations of the vasospasm responsible for this component of migraine is considered. The differential diagnosis as to when migraine is caused by a possible organic lesion is also briefly mentioned. 16 references.—*Author's abstract*.

178. *The Diagnostic Importance of the Myxoedema Reflex (Woltman's Sign)*. C. STUART HOUSTON, Yorkton, Saskatchewan, Canada. Canad. M. A. J. 78:108-112, Jan. 15, 1958.

In patients with myxedema, the muscle stretch reflexes usually show a characteristically delayed relaxation after contraction, called Woltman's sign or myxedema reflex. The

finding of 5 new patients with myxedema in five months in a general practice suggests that this condition is fairly common. Woltman's sign of myxedema was present in all five cases. The tendo achilles is the best site at which to demonstrate this sign, but it may be detected in other muscle stretch reflexes. The patient is seated on the examining table, with lower legs dependent, so that the relaxation phase of the ankle reflex will be in an opposite direction to gravity, and thus more readily apparent. The foot is held gently in one hand and the tendo achilles tapped with a reflex hammer with the other hand. The magnitude of deflection may be somewhat diminished or may be normal, and the speed of contraction is comparable to any normal reflex response. The crucial part is the relaxation phase: instead of quickly returning to the starting position, the foot comes back very slowly, taking almost a full second to return. The author states that, once one has felt the slow relaxation of a myxedema reflex, it is surprisingly easy to differentiate from a normal reflex. A plea is made for a greater awareness of myxedema. Probably in few other diseases is the diagnosis so often missed. The patient's complaints are usually commonplace and nonspecific. The physical signs are easily overlooked unless the doctor is alert to their significance. Only when the diagnosis has once been entertained does careful questioning elicit the usual symptoms of myxedema. Woltman's sign is a useful diagnostic aid (there are no "false positives" recorded), and in many instances it will by itself suggest the correct diagnosis. This is all the more important because myxedema is such a satisfactory disease to treat. 13 references. 4 figures. 1 table.—*Author's abstract.*

179. *The Grasping Deficit in Infantile Spastic Hemiparesis.* THOMAS E. TWITCHELL, Boston, Mass. *Neurology* 8:13-21, Jan., 1958.

Voluntary grasping in infantile spastic hemiparesis results from a learned adaptation of the traction response as a flexor synergy of the upper limb. The synergistic flexion of wrist and elbow, however, contributes to deficient power of grasping, owing to the mechanical disadvantage interposed by such flexion. Slowness and loss of dexterity also occur. They are related to overactivity of the avoiding response and manifested as an initial extension of fingers and wrist as the hand approaches to grasp an object. This factor may also induce further weakness as the object grasped provides contactual stimulus for an antagonistic response. 13 references. 3 figures.—*Author's abstract.*

180. *Abnormal Responses to Muscle Relaxants in Carcinomatous Neuropathy.* P. B. CROFT, London, England. *Brit. M. J.* 1:181-187, Jan. 25, 1958.

It is recognised that myasthenic features may be present in patients suffering from carcinomatous neuropathy and myopathy. Three patients with carcinomatous neuropathy, but without overt myasthenia, showed abnormal responses to muscle relaxants. Two other patients with carcinoma, but without obvious neurological disorder, showed similar abnormal sensitivity to these drugs. It is emphasized that myasthenia should be regarded as a symptom that is found classically in myasthenia gravis, but that may also be present in other conditions, including thyroid disease, polymyositis, and nutritional disorders, in addition to carcinomatous neuropathy. The various forms of neuromuscular block are mentioned, and the possible causes of abnormal responses to muscle relaxants are discussed. Cholinesterase deficiency

may be a factor in the myasthenia of carcinomatous neuropathy, although such a defect would not easily explain the abnormal sensitivity to drugs of the competitive (nondepolarizing) type. It is suggested that patients with carcinoma who give a vague history of general weakness may have an early carcinomatous neuropathy. Such patients, and others in whom there is reason to suspect carcinomatous neuropathy, should not be given muscle relaxants (for example, during bronchoscopy) without a realization of the possible risk; an initial test dose should be used to assess the patient's sensitivity to the drug. The danger appears to be especially great in neuropathy associated with carcinoma of the bronchus, but of the patients reported in this paper 1 had carcinoma of the sigmoid colon and another carcinoma of the prostate. Investigation of patients with carcinomatous neuropathy, using combined clinical, biochemical, histochemical, and electromyographic methods of study, may help to solve the problems of the metabolic disorders that cause this important complication of carcinoma, particularly of the bronchus. 68 references.—*Author's abstract.*

181. *Loss of Consciousness and Convulsions with Congenital Heart Disease.* H. RICHARD TYLER AND D. B. CLARK, Baltimore, Md. A. M. A. Arch. Neurol. & Psychiat. 79:506-510, May, 1958.

Eighteen per cent of patients with congenital heart disease have disturbance in consciousness. A review of 227 patients with episodes of unconsciousness and 109 patients with convulsive disorder in association with congenital heart disease is presented. The vast majority were secondary to "cyanotic and dyspneic spells." Cerebral abscess was present in 17 and cerebral thrombosis in 12 of the 109 patients who had convulsions. The cyanotic and dyspneic attacks and the relation of convulsions and loss of consciousness to hypoxia are discussed in detail. It was shown that all patients with less than 2 volume per cent of oxygen in femoral arterial blood have had convulsions. All patients with less than 4 volume per cent oxygen in femoral blood have had either disturbances in consciousness or convulsions. One half of the patients with 4 to 10 volume per cent had disordered states of consciousness. These were rarely seen when arterial oxyhemoglobin saturation was greater than 60 per cent. 7 references. 4 figures. 2 tables.—*Author's abstract.*

182. *Diagnosis and Treatment of Facial Pain.* GEORGE W. SMITH, Augusta, Ga. J. A. M. A. 166:857-866, Feb. 22, 1958.

Facial pain, which is sometimes extremely severe, may be caused by either intracranial or extracranial conditions. The differential diagnosis is difficult and confusing. The factors that contribute to this difficulty include the multiplicity of the cranial and cervical nerve sensory pathways, the variability and overlap of the sensory dermatomes, the extensive cortical representation, and the low threshold for pain about the face. The several clinical syndromes responsible for facial pain include (1) organic etiological factors, such as paranasal and dental inflammations; neoplasia of the cerebellopontine angle or middle fossa; nasopharyngeal neoplasms with extension and aneurysms or anomalous vessels; (2) tic douloureux; (3) postherpes zoster neuralgia; (4) geniculate neuralgia; (5) glossopharyngeal neuralgia; and (6) atypical facial neuralgia. The therapeutic considerations include eradication of organic causes, the relief by medical agents, procainamide and alcohol block of sensory nerves,

and surgical section of sensory pathways. The best-known clinical syndrome marked by facial pain is trigeminal neuralgia. Treatment by root section generally gives good and permanent relief of pain, but the price that patients pay for complete relief is total anesthesia in the corresponding area. One medical treatment takes advantage of the unusual neurotropic action of stilbamidine isethionate. Injected intravenously, this drug produces a trigeminal neuropathy consisting of hypesthesia and paresthesia but no motor paralysis. This action is slow but prolonged. The paresthesias, which are usually self-limited, are troublesome in at least 20 per cent of the cases. Since this drug action affects the fifth nerve, careful differential diagnosis is essential in order to preclude futile treatment of atypical neuralgias or tics involving the seventh and ninth nerves. 12 references. 2 figures.—*Author's abstract.*

## ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM

183. *A Theory of Nerve Deafness.* R. L. GREGORY AND J. G. WALLACE, Cambridge, England. *Lancet* 1:83-84, Jan. 11, 1958.

Conduction deafness is regarded simply as acoustic attenuation in the middle ear. It is suggested that nerve deafness is quite different, being due either to loss of functional nerve fibers or to raised "neural noise" producing masking of acoustic signals. Recruitment in nerve deafness is compared with the selective low intensity loss in acoustic noise found by Fletcher in 1938. An experiment is described in which normal subjects were presented with continuous tones having amplitude-modulated tone pips of the same frequency that were set to an intensity where they were just discriminated from the continuous tone. In addition, various levels of acoustic noise was added. Families of curves were obtained by plotting  $\Delta I$  against  $I$  for the tones for each level of acoustic noise masking. Nerve deaf patients were tested in a similar manner but without noise masking. Their  $\Delta I$  against  $I$  curves were grouped according to their degree of hearing impairment, as judged by absolute threshold for tone pips. The two sets of curves were found to be similar. By comparing the sets of curves it was possible to estimate the effective masking level of the postulated neural noise in the nerve deaf patients. Cases of nerve deafness in which recruitment is not found may be due to loss of functional fibers rather than to raised neural noise. There are implications for deaf aid design.—*Author's abstract.*

184. *Studies on the 5-Hydroxytryptamine (Serotonin) Content in Human Brain.* E. COSTA AND M. H. APRISON, Galesburg, Ill. *J. Nerv. & Ment. Dis.* 126:289-293, March, 1958.

The 5-hydroxytryptamine (serotonin) content of 28 specific human brain parts was determined by Garven's modification of Gaddum's bioassay method. The brain tissue was obtained at autopsy time from 6 hospitalized patients. Case histories were included. It was found that the areas of the allocortex had higher serotonin concentrations than that of the isocortex. The highest level of the allocortex was found in the anterior perforated substance. Data was also given for the serotonin content in the neostriatum and paleostriatum, the former being in general considerably higher. The highest concentration of serotonin per unit weight of tissue was in the mesencephalic structures (mainly substantia nigra and red

nucleus). The diencephalic structures (hypothalamus) also were found to contain relatively large amounts of the hormone. The cerebellum as well as the isocortex had the lowest serotonin content. A figure in which the relative brain serotonin concentrations are mapped was included. 19 references. 1 figure. 4 tables.—*Author's abstract.*

## CONVULSIVE DISORDERS

185. *Recent Advances in Interpretation and Management of Epilepsy.* THOMAS W. FARMER, Chapel Hill, N. C. South. M. J. 51:173-176, Feb., 1958.

Recent studies of the metabolic fates of some of the anticonvulsant compounds have indicated that mephobarbital is demethylated in the body to phenobarbital, and that mesantoin is demethylated to nirvanol. Approximately 20 per cent of mysoline is converted to phenobarbital. Seizures can be controlled by anticonvulsant medication in the majority of cases. In grand mal and focal epilepsy, the use of relatively nontoxic drugs, including phenobarbital, diphenylhydantoin and primidone, can be used to achieve complete control in about 50 per cent of cases. Marked improvement is obtained in an additional 35 per cent. In psychomotor epilepsy, diphenylhydantoin, primidone, and phenobarbital should be tried initially, and methylphenylethyl hydantoin used only if necessary. With these medications 28 per cent may be completely controlled, and 50 per cent will show a significant decrease in frequency of seizures by 50 per cent or more. In petit mal epilepsy, an initial effort may be made using dextro-amphetamine sulfate or phenobarbital. If unsuccessful, then the most effective agents, trimethadione and paramethadione, should be used. Intravenous diphenylhydantoin is probably the treatment of choice in status epilepticus. This is given in a total dose of 150 to 250 mg. at a rate of 50 mg./minute. If not successful, intravenous phenobarbital or paraldehyde may be used. After initial control of convulsions, oral anticonvulsant medications are administered. Surgical excision of epileptogenic foci is indicated only in an occasional patient. In the excision of such focal scars, improvement may be expected in approximately one half of cases. 12 references.—*Author's abstract.*

## DEGENERATIVE DISEASES OF THE NERVOUS SYSTEM

186. *The Tuberous Sclerosis Complex.* REUBEN M. CARES, Kings Park, N. Y. J. Neuropath. & Exper. Neurol. 17:247-254, April, 1958.

There is accumulating evidence that tuberous sclerosis may be a systemic disorder in which the brain lesions happen to be the most constant and striking. The case presented was clinically confused with postpertussis encephalitis. Autopsy disclosed, besides the typical brain changes, hitherto undescribed pulmonic and splenic hamartomas. J. E., a 16 year old white girl, was admitted in 1943 because of assaultive and noisy behavior. When she was 7 months old, she had a protracted bout of pertussis followed by neurologic changes. All consultants concurred in the diagnosis of postpertussis encephalitis. For the next 9 years, she remained disturbed, had grand mal seizures several times a month, and became bed-ridden. In her final years convulsions averaged three times a week, and she expired at age 25. Tuberous sclerosis with end stages of gliosis and calcification were emphasized grossly by ultraviolet lighting. Sebaceous adenomas were not found, but an

abundance of hamartial lesions and dysplasias existed in other areas; thickened calvarium; asymmetria of the hands, lipomesenchymal tumors of the liver, kidneys, and adrenals; splenic hemangioma; and hitherto undescribed miliary alveolar dysplasias in the lungs were observed. Malformation affected branches of the renal artery. There was thus abundant evidence of the systemic nature of various tissue dysplasias in the tuberous sclerosis complex, best expressed by the term disseminated hamartiosis of Moolten. 11 references. 5 figures. —*Author's abstract.*

187. *A Clinical and Psychometric Study of the Effects of Procaine Amide in Huntington's Chorea.* H. MERSKEY, Nr. Sunderland, England. *J. Ment. Sc.* 104:411-420, April, 1958.

The literature concerning the use of procaine amide in Huntington's chorea is reviewed. Procaine amide hydrochloride was given to 8 patients with Huntington's chorea. Seven of these patients were subjected to tests of manual dexterity and accuracy, and all the patients were assessed clinically before, during, and after treatment with the drug. There was no significant improvement in test performance during the period of drug treatment, but 2 patients showed symptomatic motor benefit. Six patients showed no definite signs of improvement or deterioration. Attention is drawn to the difficulty of assessing alterations in the frequency of the involuntary movements, and the occurrence of a possible rebound phenomenon on ceasing the drug is noted. It is concluded that procaine amide should be given an adequate trial in all cases of adult chorea unless contraindicated. 14 references. 2 tables.—*Author's abstract.*

188. *Prognosis and Treatment of Multiple Sclerosis—Quantitative Nosometric Study.* LEO ALEXANDER, AUSTIN W. BERKELEY, AND ALENE M. ALEXANDER, Boston, Mass. *J. A. M. A.* 166:1943-1949, April 19, 1958.

The introduction of a quantitative method and its systematic use over eight years has supplied data suitable for quantitative statistical analysis. A total of 5635 scored neurological examinations were carried out on 554 patients with multiple sclerosis. Observation extended up to 8 years. Each examination was scored quantitatively, and reliability coefficients of 0.95 or better were established. Plotting of the scores allowed a graphic representation of the course of the disease in time, and observations were made over a duration span of illness up to 25 years. The general course of the illness was studied for all patients as well as for specific subgroups distinguished by sex and age at onset of disease and by inclusion in various treatment and control groups. The authors have established evidence that a severe form and a mild form of the disease exist, although there is some overlap between the two groups. On the basis of their quantitative method, the severe and the mild cases can be distinguished from the sixth year of the disease onward, since relatively the most active progression of the disease takes place during the first five years. Evaluation of treatment, therefore, requires comparison with carefully matched controls. When studied in this way, the only treatments showing an objective quantitative effect on the course of the illness were repeated blood transfusions and corticotropin (ACTH) therapy; the effect of the latter was maintained over periods now approaching four years. 8 references. 11 figures. 1 table.—*Author's abstract.*

## DISEASES AND INJURIES OF THE SPINAL CORD AND PERIPHERAL NERVES

189. *Ischaemic and Post-Ischaemic Numbness and Paraesthesiae*. P. W. NATHAN, London, England. *J. Neurol., Neurosurg. & Psychiat.* 21:12-23, Feb., 1958.

When a cuff is placed on a limb or a clamp placed over a nerve in a limb so as to occlude the circulation to the nerves or nerve, ischemic and postischemic paresthesia occur; they are due to spontaneous firing of the A group of nerve fibers. During the time of paresthesia, tactile and painful stimuli applied to the territory of the nerve discharging spontaneously are either not felt or they are felt in a diminished degree. This interference with the perception of stimuli is enough to cause a real disturbance of sensation, and it is described as numbness by those experiencing it. Thus numbness may be due not only to a large number of fibers ceasing to conduct impulses but also to fibers' being hyperexcitable and firing off spontaneously; in such a case, peripheral stimulation is not felt. An electrical stimulus applied by ring electrodes to the fourth and fifth digits was also not felt during the period of postischemic paresthesia. During the time it could not be felt, it was shown by recording over the ulnar nerve in the arm that sizable action potentials, of a size to cause sensation during the early ischemic period, were passing along the nerve into the central nervous system. Thus this form of numbness is not due to a failure of impulses to arrive in the central nervous system because of blocking by spontaneously arising antidromic impulses in the peripheral nerve but instead is due to some process taking place within the central nervous system. 23 references. 9 figures.—*Author's abstract*.

## ELECTROENCEPHALOGRAPHY

190. *Electroencephalographic Correlation of Laughing Fits*. ANDRE A. WEIL, WILLIAM A. NOSIK, AND NICHOLAS DEMMY, Cleveland, Ohio. *Am. J. M. Sc.* 235:301-308, March, 1958.

Unmotivated paroxysmal laughing attacks as part of an epileptic aura or seizure, or both, have occasionally been mentioned in the literature. The authors observed 4 children having epileptic laughing fits with the following diagnoses: (1) Papilloma of the third ventricle, infiltrating into the tip of the temporal lobe; (2) postencephalitic, mesencephalic seizures; (3) birth trauma with mental retardation, akinetic motor, and temporal lobe seizures; (4) birth trauma with hyperkinetic behavior disorder and nocturnal laughing fits. These laughing fits were inappropriate to any environmental factors and preceded or were a part of other epileptic phenomena; all 4 subjects had paroxysmal electroencephalographic abnormalities. Interseizure electroencephalograms showed a wide variety of abnormalities, such as focal temporal spiking and slowing, spike-dome variant formations, and diffuse slowing in 1 patient (following neurosurgical intervention but with continuation of laughing fits). Electroencephalographic recordings were obtained in 2 patients during laughing fits; both were characterized by focal, temporal lobe discharges. A review of the literature makes it apparent that laughing fits are prone to occur in disturbances around third ventricle areas and diencephalon, with projection and discharge spread to the temporal lobe. 16 references. 4 figures.—*Author's abstract*.

191. *Electroencephalographic Findings in Acute Carbon Monoxide Poisoning.* MARGARET A. LENNOX AND PREBEN B. PETERSEN, Copenhagen, Denmark. *Electroencephalog. & Clin. Neurophysiol.* 10:63-68, Feb., 1958.

Electroencephalograms were obtained on 33 patients from the first to the ninetieth day after acute carbon monoxide poisoning. The EEG's were abnormal in 18 patients, the abnormality consisting of extreme slowing in 10, marked slowing in 3, slight in 1, and in 4 the slowing was confined to the temporal leads. The slowing was asymmetrical in 14 patients, the abnormality being equally frequent on left and right. The incidence of EEG abnormality was highly correlated with the patients' age, duration of unconsciousness, and state of consciousness. Eighty per cent of patients more than 50 and 33 per cent of patients less than 49 had an abnormal EEG. Ninety-five per cent of patients unconscious in the hospital more than seven hours and 7 per cent of patients unconscious less than six hours had an abnormal EEG. All comatose or semicomatose patients and 25 per cent of those with consciousness unimpaired had an abnormal EEG. The incidence of EEG abnormality in the first week was considerably higher than when more than a week had elapsed between poisoning and EEG examination. Of 20 patients with no or slight EEG abnormalities, 12 recovered fully and none died. Of 13 patients with markedly abnormal EEG's, 2 recovered fully and 5 died. 6 references. 4 figures. 2 tables.—*Author's abstract.*

## HEAD INJURIES

192. *The Relative Merits of Encephalography and Ventriculography for the Investigation of Intracranial Tumors.* GÖSTA NORLÉN AND INGMAR WICKBOM, Göteborg, Sweden. *J. Neurol., Neurosurg. & Psychiat.* 21:1-11, Feb., 1958.

Many authors are of opinion that, in all cases where the clinical signs and symptoms indicate a brain-tumor, ventriculography is to be preferred over encephalography if an air study is considered necessary. This is especially true if the intracranial pressure is high or if a posterior fossa tumor is suspected. Encephalography no doubt results in a more complete examination since the cisterns also can be studied, but ventriculography is of course necessary in order to study the ventricular system if the cerebrospinal fluid pathways are obliterated. Improved technique has made it possible to diminish risks of air injection into the subarachnoidal space by lumbar puncture, and recently encephalography has been used more and more also in cases of tumors with signs of increased intracranial pressure. However, the materials presented are usually selected and do not give a true picture of the risks and merits of the both methods. In this paper, a consecutive series of 327 tumors is presented, in which the examination has always started with encephalography if an air study was considered to be indicated. It was concluded that, with the technique used and the precautions taken, the risks of encephalography in cases of brain tumors even with increased intracranial pressure could practically be eliminated. In posterior fossa tumors, ventriculography had to be done in most cases, but a study of the cisterns was often considered of great value in order to reveal the true nature and localization of the expanding lesion. Encephalography should therefore be performed as a first procedure in practically every case where an air study is indicated. 15 references. 7 figures. 6 tables.—*Author's abstract.*

193. *The Role of Respiratory Insufficiency in the Mortality of Severe Head Injuries.* IAN N. MAC IVER, I. J. C. FREW, AND J. G. MATHESON, Newcastle, England. *Lancet* 1:390-393, Feb. 22, 1958.

The main cause of death in patients unconscious after head injury is respiratory insufficiency and anoxia due to central disturbances of the control of respiration and reduction of compliance of the lungs by blockage or irritation of the bronchial tree by aspirated material and by retention of mucus. The following regime is suggested for treatment: (1) Correction of posture to prevent seepage into the lungs and tracheobronchial tubes; (2) temporary intubation; (3) isolation of the lungs from a disorganized pharynx by early tracheotomy; (4) further protection by continued aseptic tracheobronchial toilet; (5) the use of a lytic cocktail to coordinate the reticular mechanisms of the brain stem and control rigidity, restlessness, and hyperthermia; (6) avoidance of oral feeding during unconsciousness; (7) maintenance of physiological tensions of oxygen and carbon dioxide in the blood; (8) maintenance of fluid and electrolyte balance and caloric intake; (9) combatting of infection by use of antibiotics; (9) relief or prevention of secondary cerebral edema by use of intravenous triple plasma. It is not enough to wait until the patient reaches a special head center. The important factor is treatment along these lines as soon as possible after the accident. In our experience the mortality has already been lowered to less than 40 per cent, and with further improvement in technique it can probably be lowered to 20 per cent. Many patients previously considered hopeless will survive and will not only make a good physical recovery but also rapidly return to a nearly normal mental state. Many will be able to return to productive work. 1 reference.—*Author's abstract.*

#### INFECTIOUS AND TOXIC DISEASES OF THE NERVOUS SYSTEM

194. *The Development of Tuberculous Meningitis During Pregnancy.* CONSTANTIN STEPHANOPOULOS, Athens, Greece. *Am. Rev. Tuberc.* 76:1079-1087, Dec., 1957.

This is a report on 6 cases of tuberculous meningitis coexisting with pregnancy and a review of 31 cases from world literature. In 4 of the 6 patients the meningitis occurred as the sole tuberculous manifestation, and in the other 2 it was associated with miliary tuberculosis. In the first group 3 patients lived and 1 died. In the second group 1 lived and 1 died. A relapse was observed in 1 of the patients with miliary tuberculosis that had been successfully treated. In 3 patients delivery was at full term, and in 2 it was premature. Aggravation of the illness after delivery was observed in 2 patients, and 1 of them died. Five babies were born alive and apparently healthy, but 2 of them developed tuberculous infection and 1 died 20 days after delivery from tuberculous meningitis and miliary tuberculosis. The total number of cases found in the literature, including the 6 described in this report, is 37. The end result of treatment in all these cases, the treatment administered, the month of pregnancy during which tuberculous meningitis was first manifested, the outcome of pregnancy, and the condition of the newborn are described in detail. Pregnancy appears to make therapy of tuberculous meningitis more difficult. Nevertheless, if the diagnosis is established early and the appropriate treatment given, the ultimate results are

not too unlike results attained in the treatment of uncomplicated cases of tuberculous meningitis. 27 references. 4 tables.—*Author's abstract.*

195. *Hallucinations of Poliomyelitis Patients During Treatment in Respirator.* JACK MENDELSON, PHILIP SOLOMON, AND ERICH LINDEMANN, Boston, Mass. *J. Nerv. & Ment. Dis.* 126:421-428, May, 1958.

During the 1955 epidemic of poliomyelitis in the Boston area, a number of patients treated in tank-type respirators developed transient psychotic-like symptoms characterized by disorientation, confusion, hallucinations, and delusions. Behavioral, psychiatric, and physiological studies of these patients indicated that their symptoms did not arise from any specific toxic or metabolic factors but were the result of perceptual deprivation imposed by the unique conditions of life in a tank-type respirator. The patients exhibited a range of hallucinatory phenomena having visual, auditory, tactile, kinesthetic, and, in 1 case, olfactory and gustatory components. All the experiences were most vivid. The patients could not tell whether they were asleep or awake when they experienced the symptoms; they recalled that they seemed to occur in a quasitwilight state. The visual hallucinations were dominant in all cases, with auditory hallucinations occurring frequently. The perception of minute detail in the visual hallucinations was striking. Most of the visual hallucinations were in color, three dimensional, and in a spatial sphere that was upright in respect to gravity. The contents characteristic of these hallucinations seem to be denial of distressing reality with its ominous threats for the future; wish-fulfillment in terms of reassuring, pleasurable life situations; rehearsal-like anticipation of dreaded possibilities in speculative, preparatory fashion; and concession to the reality situation with regard to tolerable details. These findings are discussed in terms of psychodynamic psychology and recent neurophysiological developments in the field of sensory deprivation. 12 references.—*Author's abstract.*

196. *Generalized Moniliasis with Localization in the Brain.* JOHN ESCHWEGE, New York, N. Y. *A. M. A. Arch. Neurol. & Psychiat.* 79:250-263, March, 1958.

The incidence of generalized moniliasis, especially of forms affecting the central nervous system, has greatly increased since the introduction of the broad-spectrum antibiotics. Nevertheless, no detailed description had yet been made of the histological changes caused within the brain by *Candida albicans*. The case of a 21 year old man, admitted to the University Hospital, Zurich, with the diagnosis of meningoencephalitis of unknown origin is described. Laboratory studies, at first, suggested lymphocytic choriomeningitis. The patient was put on intensive antibiotic therapy and was also given an antifungal agent and vitamin B complex as a prophylactic measure against fungal disease. Twenty-four days after admission the patient suddenly developed signs and symptoms of an ulcerative colitis. His condition became progressively worse, and he died approximately one month after hospitalization. The autopsy revealed a generalized fungus infection, with metastatic foci of *C. albicans* demonstrated in the peripheral musculature, the myocardium, the colon, the kidneys, and the brain. Macroscopically, the brain was large, weighing 1550 Gm., but otherwise it was not remarkable. Microscopically, the cerebral changes were of four types: (1) Fungus metastases, all surrounded by glia cell nodules of varying sizes, principally,

but not exclusively, in the gray matter of the entire brain, with sites of predilection in the medulla oblongata and the basal ganglia, the thalamus, and the cortex of the temporal regions; (2) perivascular lymphocyte and plasma cell infiltrations, not directly dependent upon the nodules, but more frequent in these nodule areas; (3) extensive areas of reactively increased and hypertrophied astrocytes and microglia cells in the gray, and more seldom in the white, substance, not directly correlated with the nodules; (4) severe dementia paralytica-like destruction and reaction centers in a closely circumscribed temporal region. Histopathologically, the *Candida* encephalitis described herein differs from the other so-called metastatic focal encephalitides of viral or bacterial origin in the larger size of the granulomas and the more extensive destruction of the nerve parenchyma in isolated areas of the cerebral cortex. If we believe that every mycotic infiltration that ulcerates and comes into contact with the blood stream may lead to a hematogenous dissemination of the fungus, we may assume the colon to have been the point of origin for the dissemination of the mycosis. The prognosis of manifest generalized moniliasis remains grave. The indiscriminate use of antibiotics, particularly of those with a broad spectrum, without the proper indication must be avoided. 47 references. 10 figures.—*Author's abstract.*

## NEUROPATHOLOGY

197. *Multilocular Cystic Encephalopathy of Infants.* L. CROME, London, England, J. Neurol., Neurosurg. & Psychiat. 21:146-152, May, 1958.

The brain of an infant who had had severe neonatal asphyxia and died at the age of 3½ months showed extensive symmetrical cystic multilocular encephalomalacia. Some of the veins of the subarachnoid space were obstructed by partially recanalized plugs of connective tissue. The main radicles of the great cerebral veins showed thickening and focal mural calcification. Some arteries in the subarachnoid space were also obstructed by an intramural collar of embryonic-like connective tissue. The literature relating to this condition is reviewed. The vascular changes were tentatively interpreted as organization of old thrombi. 25 references. 9 figures.—*Author's abstract.*

## MISCELLANEOUS

198. *Difficulties in the Diagnosis of Caudal Tumors.* W. GROTE. Nervenarzt 6:260-264, June, 1957.

The so-called caudal tumors are mainly benign tumors (ependyomas, neurinomas, meningiomas, hemangiomas, lipomas, dermoids, and teratomas). Surgical treatment is successful; there are seldom relapses. It is often difficult to distinguish them from a medial prolapse of the disk unless there are massive symptoms. All authors, however, agree that the leg- and backaches that occur are continuous pains without painless intervals, independent of an involvement of the spinal chord. There is a difference of opinion on the occurrence of different neurological irritative symptoms and their evaluation. Eight of his cases in which caudal tumors showed the exact picture of a prolapse of the lumbar disk and made the correct diagnosis impossible are described by the author in detail. These cases were exclusively chronic sciaticas on one or both sides with massive spinal symptoms in patients

of different age groups, and all patients were treated unsuccessfully for a long period of time for a prolapse of the disk. As long as a caudal tumor is concealed by a one-sided sciatica, there is no harm in conservative treatment. However, when sciatica on one or both sides resists therapy, lumbar and cisternal spinal fluid examinations should be made. If the lumbar tap shows an increase in albumen of over 40 mg. per cent, myelography is indicated. Only by this method can caudal tumors without any other neurological findings be recognized early and successfully operated upon in time.—Author's abstract.

## BOOK REVIEWS

*Education and Human Motivation.* H. HARRY GILES. New York, N. Y. Philosophical Library, Inc., 1957. 108 pp. \$3.00.

This monograph, by H. Harry Giles, director of the New York University Center for Human Research Studies, is, in effect, a plea for a greater awareness of the desirability, even the necessity, of developing new integrated insights into social purpose if we are to achieve for the "human sciences" an effectiveness comparable to that which has been achieved by the physical sciences.

The author develops the thesis that the will to grow is a characteristic of all living things. Continuing maturations at different rates are an important aspect of this growth. He finds an apparent lack of awareness of this condition in current educational practices. He believes our educational system must preserve for every individual a feeling of the possibility for continued growth. The question is raised as to whether or not, in pursuit of the "education for all" ideal, we have tended to so formalize our educational structure that the sense of growth and belonging is all too frequently destroyed.

According to the author's theory of "growth-belonging," there is a constant struggle by man in all climes and at all times to achieve freedom to grow, to develop all abilities, and to contribute to his society. However, since change is always occurring, the author believes that leaderless change greatly reduces the possibility for maximum growth of the individual and society. The human sciences, therefore, must actively support an integrated theory of human motivation, such as the one he proposes, if the democratic goal to promote the "maximum growth of all" is to be achieved.

Some worth-while ideas are presented and, although they are hardly novel, they could have been more effectively developed. An attempt is made to document the ideas by numerous quotations and brief references to well known persons in various fields, a name-dropping device that is not convincing and that adds nothing to the readability. This little book seems to fall far short of the inspirational effect that was its apparent purpose.—*Albert D. Annis, Ph.D.*

*The Guilty and the Innocent.* WILLIAM BIXLEY. New York, N. Y. Philosophical Library, 1957. 176 pp. \$6.00.

This is a fairly sprightly account of some famous cases which have been tried at the Old Bailey. The author was for 50 years a "supervisory official" of the Central Criminal Court in London.—*Winfred Overholser, M.D.*

*Theories of Personality.* CALVIN S. HALL AND GARDNER LINDZEY. New York, N. Y. John Wiley & Sons, Inc., 1957. 572 pp. \$6.50.

*Theories of Personality* is a timely survey of personality development and it provides a single source to which those interested can turn for a survey of the existing theories of personality. It provides compact and comprehensive summaries of the major contemporary theories of personality written at a level appropriate for graduate or undergraduate instruction. The book was written primarily for students, but it may serve as an excellent reference for the serious practitioner.

Twelve of the fourteen chapters are devoted to theorists and theory, including Freud, Jung, Adler, Fromm, Horney, Sullivan, Murray, Lewin, Allport, Goldstein, Angyal, Maslow, Lecky, Kretschmer, Sheldon, Eysenck, Cattell, Dollard, Miller, Sears, Mowrer, Rogers, and Murphy. The first chapter is a discussion of the "Nature of Personality Theory" in which the authors are willing to accept any general theory of behavior as a theory of personality. In judging the importance of a theory, they rely primarily upon their evaluation of the influence the theory has had upon psychological research and formulation; they have done this in an expert fashion.

There are three refreshing approaches used, namely, clear, factual development of theories, unique chapter organization, and reporting in a positive light. Each of the twelve major theories presented in this book is discussed without bias in a clear expository fashion. Empirical work and hypotheses generated and stimulated by the specific theory are given. This part of the material lays bare the practical side of theoretical usefulness.

Another refreshing aspect of the material is that each theory is introduced with a brief recount of the personal history of the theorist, the main lines of influence upon the theory, and a summary of the salient tenets of the theory. This is followed by a section on "Structure of Personality and Dynamics," which depicts the motivational notions and principles held by the theorist. "Development of Personality" follows; the section succinctly explains personality growth and change as represented by the theorist. Characteristic research, research methods, and current status and evaluation are offered at the close of each chapter. In presenting the theories in a positive light, the authors took particular cognizance of those features of the theory that seemed most useful and suggestive. Much of this may be attributed to the fact that several of the theorists read and criticized the accounts of their own theories before the book was published.

In general, the main purpose of this book has been fulfilled, that is, ". . . to present an organized summary of the major contemporary theories of personality." This work places the theories in a general context, relates them to psychological history, and places them in the proper contemporary perspective.—*Lonnie E. Mitchell.*

*Erogenicity and Libido, Vol. I.* ROBERT FLIESS. New York, N. Y. International Universities Press, 1957. 325 pp. \$7.50.

This is the first of a series of monographs based on the author's 25 years of clinical psychoanalytic practice using the psychoanalytic method as a research tool. The material of necessity is at times fragmentary and disparate, but, as the author points out: "One cannot bend material to one's interests, let alone experiment with it; one has to take what each pa-

tient presents and subordinate one's own scientific interests to his therapeutic needs." Although the book is in no way didactic, it is organized in three large sections. The first is devoted to the examination of three fundamental, if controversial, hypotheses of Freud: (1) The dualistic theory of instincts, (2) phylogenetic inheritance, and (3) libido theory. The second, which constitutes the main portion, presents the clinical observations of the author that are pertinent to the theory of psychosexual development. The section stresses, by clinical example, the extensive overlapping of the various phases in psychosexual development. The third section is really a brief chapter on erogenic language, describing the functional characteristics of certain erogenic zones that have become directly observable in consequence of their displacement upon the speech apparatus, where they modify verbalization. The author throughout has rooted his theoretical contributions to psychoanalytic theory in clinical material. His deductions can easily be followed because they are supported by case history material and because he meticulously stays within the confines of this material; however, he not only taps his own vast experience but uses his extensive knowledge of the writings of Freud, Abraham, and more recent workers who support his theoretical elaborations. He also employs fragments of Shakespeare in a rather novel way, using them very much in the same way that he uses material from patients.—A. H. Kirschoff, M. D.

*The Mammalian Cerebral Cortex.* B. DELISLE BURNS. London, England, and Baltimore, Md. Edward Arnold and Williams and Wilkins, 1958. 119 pp. \$5.00.

This compact study is one of the monographs of the Physiological Society, and deals primarily with neurophysiological concepts. The author is one of the leading workers in his branch of neurophysiology, and many of the reported concepts are based on his own work. However, there is good coverage of the experimental work of other investigators, and opposing theories are discussed with proper detachment. As is pointed out in the preface, the electrical activity of individual cells of the brain could be studied only when adequate instrumentation had been developed. This study has been accomplished relatively recently; most of the reported work has been carried out in the last 15 years. An historical survey of work in the earlier years of the century is included, together with a discussion of the difficulties encountered by these pioneers. The author arbitrarily classifies cortical nerve cells as types A and B. The division is based on the character of the evoked response to electrical stimulation of the isolated cortex. The isolation is achieved by undercutting a slab of cortex and leaving the overlying meninges intact, so that the blood supply to the segment is not greatly disturbed. By this procedure, the author believes, conditions comparable to normal are retained. From his experiments he concludes that the type B cells are of vital importance for the transmission of excitation from one part of the cortex to any other part; however, actual demonstration of transcortical spread of normal patterns of excitation has not been precisely proven. The general problem of spontaneous cortical activity has occupied a number of investigators. Experiments to date have failed to elicit evidence of such activity in the slabs of isolated cerebral cortex, and the author believes that the importance of the problem has been overestimated. A discussion of spreading cortical depression is included in the chapter on the transmission of cortical excitation. Marshall has published later work on this phenomenon than that alluded to in the text, where only the effects of dehydration

are mentioned as a probable cause. The author does agree with Marshall and other investigators that spreading depression has little to do with normal brain function, but that its possible relationship to brain concussion adds importance to its study. In the final chapter, memory is discussed from a neurophysiological standpoint. The author admits that none of the hypotheses so far advanced concerning memory have proved fruitful but believes he is justified in presenting them anew because of their possible heuristic value.

The book is generally clearly written, though it has obviously been impossible to avoid using the terminology particular to neurophysiology alone, which the author wished to do; consequently, it is doubtful whether a reader not working in the field would find it easy reading. To an experimenter investigating the cortex, it is invaluable for its survey of results and discussion of methods. There is a good index and an exhaustive bibliography.—*Meta A. Neumann.*

*The Mind of the Murderer.* W. LINDESAY NEUSTATTER. New York. Philosophical Library, 1957. 230 pp. \$6.00.

The author, an experienced English forensic psychiatrist, presents, primarily for a non-professional audience, a series of murder cases. There are 16 chapters, with such titles as Bennett, the Schizophrenic; Straffen, the Mental Defective; Ley, the Paranoiac; Melancholic Murderers. In each case there is a brief discussion of the psychiatric aspects after describing the main facts of the crime. The author has done a useful service; he presents factually a series of murders committed largely by definitely pathological persons and thus does much to counteract many popular delusions regarding the murderer. He points out, too, the basic invalidity of the McNaghten rule and gives us a British answer to the rule's invalidity, namely, the doctrine of diminished responsibility, long recognized in Scotland but somehow neglected in the rest of the English-speaking world until adopted in England (1957) by the Homicide Act.—*Winfred Overholser, M.D.*

*Magic, Myth and Medicine.* DONALD T. ATKINSON. Cleveland and New York. World Publishing Company, 1956. 319 pp. \$5.00.

The author is not only a medical historian; he is a medical pilgrim. In this series of interesting accounts of the accomplishments of physicians he not infrequently mentions having visited the site of the activities of this or that subject. This fact lends a personal touch and adds to the vitality of the author's words. He points out how medicine originated from magic and gives a sketch of the Greek, Roman, and Arabic contributions. He then proceeds to give highly readable accounts of how, bit by bit, the foundations of modern medicine were laid by such observant and brave men as Agrippa, Paracelsus, Paré, Harvey, Beaumont, McDowell, Lister, Long, and Roentgen, to mention only a few of those discussed in the 34 chapters. The book is highly informative and enjoyable and can be heartily recommended to the physician and layman alike.—*Winfred Overholser, M.D.*

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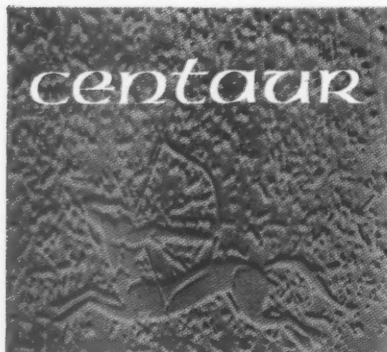
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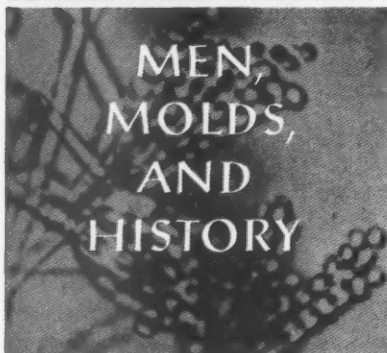
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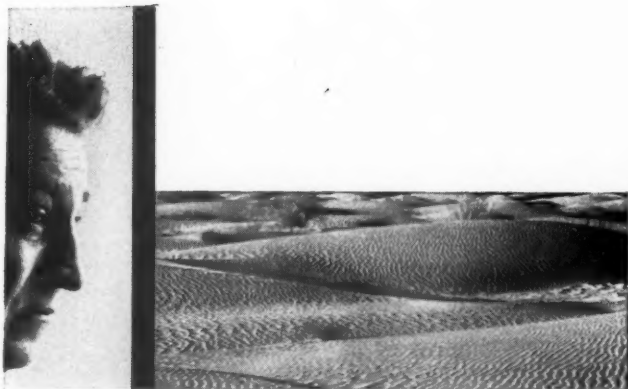
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